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STEEL

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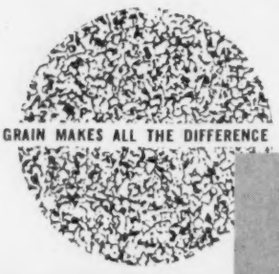
PRODUCTION · PROCESSING · DISTRIBUTION · USE

NATIONAL STEEL HIGH TENSILE ALLOY

DUCTILOY



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PRODUCTION • PROCESSING • DISTRIBUTION • USE

As the Editor Views the News

■ STEELMAKING last week (p. 19) held at 94 per cent, despite slight variations resulting from shutdowns for furnace repairs. Moderation in finished steel orders (p. 81) is more pronounced, now that buyers have accumulated larger inventories and in many cases have covered needs four to six weeks ahead. However, this is not influencing current shipments. Backlogs will support heavy production through January, and deliveries on some products extend into February. Steel orders for structural shapes and reinforcing bars are slower, partly because of the season. Buying of track material and railroad equipment is quiet, but a large steel tonnage is required to fill previous orders. Automotive steel needs are heavier. Scrap prices are tending to level off in some districts, following the recent decline.

• • •

Program for economic defense against the impact of Europe's war was offered (p. 15) by the National Association of Manufacturers meeting in New York. Internal unity and strength is this country's best assurance for freedom and peace, according to association's 8-point platform. Maintenance of individual initiative and free enterprise is placed as first business need. . . . Automobile production (p. 30) passed the 100,000-mark for the first time this year as all Chrysler plants resumed. . . .Detroit Council for Industrial Peace suggests a platform (p. 30) that well might be impressed on your congressman before the time comes for revising the Wagner act. . . . Special congressional committee (p. 25) will start its investigation of the labor board this week. . . . Canada's iron and steel industry (p. 20) is expanding under war impetus. . . . Landis Tool Co.'s new plant (p. 21) contains the country's largest "down-draft" spray painting stand.

Industry's Program

• • •

Bureau of mines' survey of scrap consumers and suppliers (p. 33) develops the fact that Sept. 30 they had 7,220,000 tons on hand, ten weeks' supply. Compared with 1938 practice open hearths used less scrap and more pig iron, cupolas used more scrap, less pig iron. . . . Steel and iron imports in October fell 36 per cent from September, (p. 32) belligerent countries shipping much less than usual, while neutrals increased their contributions somewhat. More than twice as much scrap has been imported so far this year as in the same period last year. . . . Diesel-electric switching locomotives are sufficiently established and standardized that Baldwin Locomotive Works, (p. 32) is building 28 by line production methods, ready to be bought from the floor like automobiles, in 1000 and 660-horsepower units.

Scrap Surveyed

• • •

Quick-acting indexing devices and other refinements reduce idle time on modern machine tools, points out Guy Hubbard, STEEL's machine tool editor (p. 38). . . . New welding positioner, (p. 71), carries up to 6000 pounds, has work table rotatable through full circle. . . . Making shafts and pivots for electric meters (p. 40) involves watch-like precision. Pivot points must withstand calculated stress of 700 tons per square inch. Special furnace "shoots" parts by inertia into quench bath. . . . New shuttle belt conveyors on ships (p. 42) minimize breakage of coal and blowing away of fine particles, permit unloading to any point, even to barges alongside ship. . . . Symposium on precipitation hardening (p. 48) shows ten-fold increase in hardness by aging of certain gold-platinum alloys.

Idle Time Reduced

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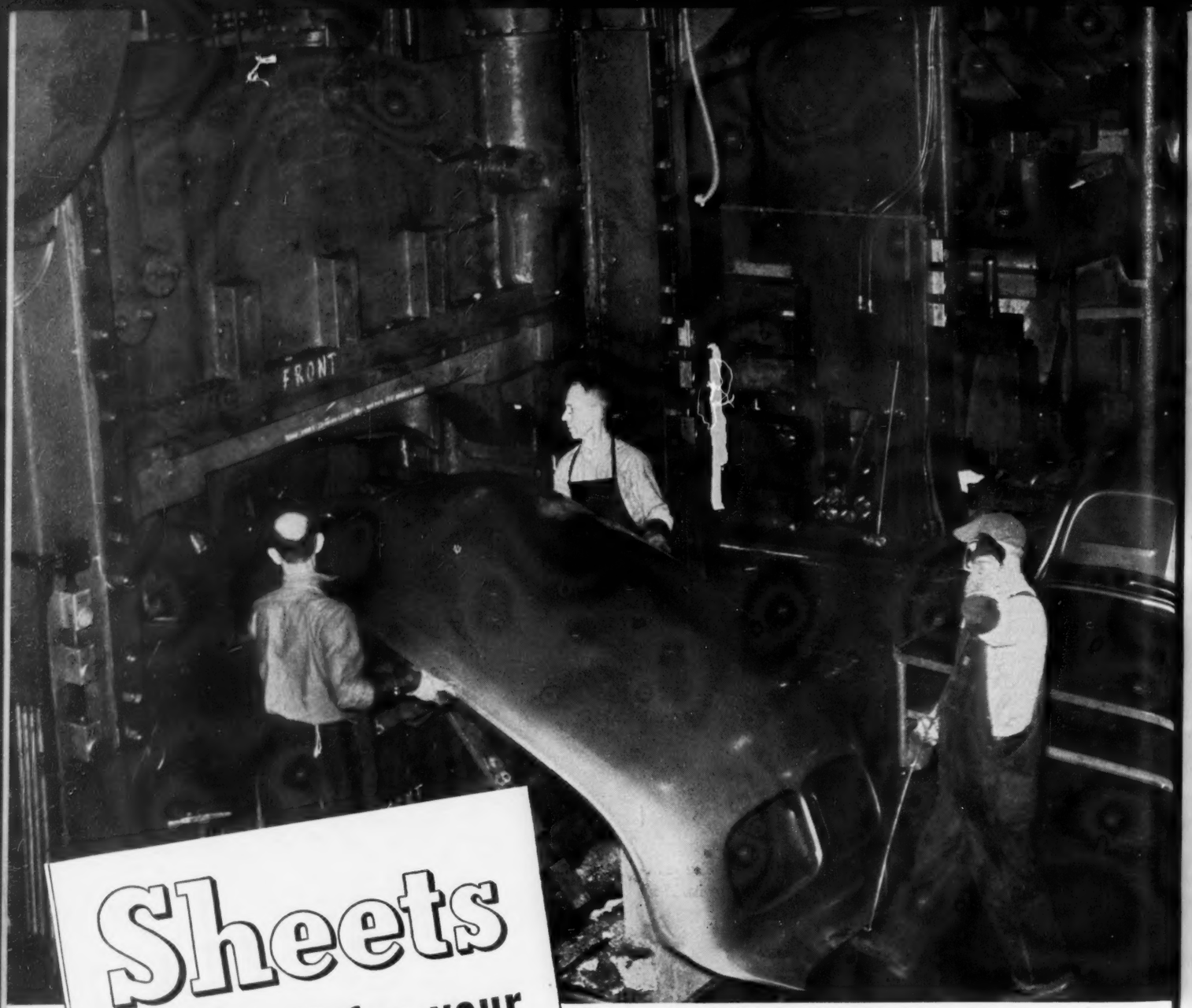
Buffalo plant completes $1,000,000 expansion and modernization program. Wire mill addition (p. 44) doubles space for wire production. New equipment includes two bell-type annealing furnaces, one electric, one gas fired. . . . Industry needs a training program for young mechanical engineers, was conclusion of one speaker at sixtieth annual meeting of American Society of Mechanical Engineers in Philadelphia (p. 27). New production methods to lower costs also needed. . . . Cost of railway trestle is cut one-third (p. 55) by unique all-steel welded design. . . .New method of high production punching (p. 62) permits holes to be made at various angles simultaneously, simplifies setups, permits almost 100 per cent of equipment to be salvaged when model changes are necessary.

Wire Mill Expanded

E C Kreutzberg



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SHEETS STRIP TIN PLATE BARS PLATES FLOOR PLATES STRUCTURALS PILING RAILS TRACK ACCESSORIES REINFORCING BARS

Economic Defense Against War's Impact Urged by Manufacturers

Maintenance of Free Enterprise and Individual Initiative Primary Need . . . Internal Harmony and Unity Essential . . . Industry Reiterates Opposition to the United States' Involvement in European Conflict

NEW YORK

■ "FORWARD with the Republic!" That was the theme of this year's Congress of American Industry in New York, Dec. 6-8, under auspices of the National Association of Manufacturers. Congress was not concerned strictly with industry's problems but with the nation's in the belief that preservation of liberty and democracy is paramount.

That conclusions advanced should be comprehensive in character and scope, speakers included not only industrialists, but leading representatives of government, agriculture, labor, journalism, education, the clergy, women and youth.

Discussion covered fundamentals of the American way of living. Included were private enterprise, social organization, civil and religious liberties. Private enterprise was viewed from various angles, including invested capital, patents, reasonable taxes and equitable government policies. Attempt was made to define responsibilities of management, women's groups, government and labor toward better labor relations.

"Doubt has been cast on security under our American system," declared Howard Coonley, chairman, Walworth Co., Boston, and retiring president of the manufacturers' association, in explaining the program. "We once thought security was to be attained by individual effort through equality of opportunity.

"Instead of availing ourselves of our great resources, our productive facilities, our genius in tested processes for providing work and security, we have sought other formulae including security provided by government. Here is a complex situation which holds not only economic, but political and moral dangers for our people. Its warning signs of inevitable disintegration are in the as yet abortive Townsend, $30 every Thursday, and "ham-and-eggs" plans.

Still Have Frontiers

"Doubt has also been cast on opportunity for the individual under our American system. Development of railroads, motor cars, airplanes, radios and the hundred and one other industries in this country opened up new fields of human activity. They accustomed Americans to ever-broadening horizons, creating more wealth and more work. As these have become to varying extent past history in their pioneer stages, doubt says: 'Our industrial frontiers are gone.' Instead of seeing in them, by the very fact of their development, evidence pointing to the new frontiers made available by our free enterprise system, we doubt the vehicle, the system itself, that alone, time after time, has given us our opportunities.

"Again, doubt raises its head because of depression and unemployment. What avail is our work and thrift, of what benefit is our democratic system, if we are to be struck down in this way? Yet no system in historical knowledge has been guarantor against the cyclical manifestations of depressions, bringing with them temporary increase of unemployment. Nor is that an alibi. The causes and effects of depressions must be found. That is one of the purposes of this congress.

"The question of taxes raises doubts for all of us. Taxes have increased to the danger point.

■ **Manufacturers representing all industries and all sections thronged the main ball room at the Waldorf-Astoria hotel, New York, Dec. 6-8, at the forty-fourth annual Congress of American Industry**

Burdensome taxes sap the life-blood of private enterprise. Taxes are diverting 20 to 30 per cent of the national income from productive enterprise. Excessive taxes are damming up the sources of investment. More than that, we wonder whether we might not discover that democracy and private enterprise are being whittled away by the erosive processes of taxation.

"There are doubts raised by the encroachment of government on the functions of industry and by government competition with business, existing and threatened, doubts as to the government's monetary policies, the running up of a staggering public debt. And there are doubts as to how to strike a fairer balance between the right and privileges granted employes on the one hand and employers on the other—all of them doubts which undermine confidence, which check the flow of capital, which hamper the effort to provide more employment."

Abandoning Basic Principles

Loss of life in the Civil war and its economic setbacks were far more exhausting than our losses from the World war, said Mr. Coonley. Despite long continued business prostration as an aftermath of the Civil war, our forefathers continued the private enterprise system, with the result that the country, after it eventually recovered, made its greatest progress. Since the World war, there has been a gradually developing tendency to abandon basic principles. States' rights have tended toward abridgement and the swing has been toward government competition with business, toward bureaucracy and increasing government control and regulation of business. A return to our original concept of the democratic way of life, said Mr. Coonley, is needed.

Principles he cited: The greatest measure of individual liberty compatible with public interest; functioning of the government within its constitutional sphere as a servant of the people, rather than as master; government through legislation enacted by the people's representatives, rather than by executive decrees, or by administrative regulations issued at the whim of bureaucrats; lifting the intolerable tax burden levied in the name of social benefits, by the elimination of extravagances and wastes which in themselves create social insecurity and promote moral decay; raising living standards to higher levels and to embrace more of the people, by adherence to individual private enterprise and incentive; keeping intact our national trinity—representative political democracy, religious and social liberties and free enterprise—"realizing that they are inseparable and, with one lost, all are lost."

American history is honeycombed with instances to prove an economy based on government planning is a dangerous condition, according to J. Howard Pew, president, Sun Oil Co., Philadelphia. Government officials and the public laughed at John Fitch's steamboat, Langley's flying machine, the telephone, Henry Ford's folly and many other great inventions. Had it not been for private enterprise these, and countless other developments which have contributed to our progress, would have been retarded indefinitely.

Some countries, warned Mr. Pew, once noted as leaders in the march of human progress, today are burning books, suppressing free thought, regimenting education and chaining the race to the wheels of power politics.

The United States, he declared, must continue free to think, to speculate, experiment, inquire, if it is to continue on the path of progress.

The centuries-old struggle for con-

Industrial Congress' Declaration of Principles

■ MAINTENANCE of individual initiative and free enterprise was set forth as No. 1 business need in the congress' declaration of principles, which supplanted the platforms adopted at 1937 and 1938 meetings.

The 8-point declaration was submitted by Clarence Francis, president General Foods Corp., New York, and Col. Charles E. Speaks, president, Fisk Rubber Corp., Chicopee Falls, Mass. It is the result of three months' work and 800 manufacturers participated in its formulation. Highlights of the declaration:

1. Maintenance of individual initiative and free enterprise, in competition for the consumer's dollar, on the basis of both price and quantity.

2. Recognition of the profit motive's social value as a powerful incentive to all productive effort.

3. Recognition of the vital importance of private savings and investment for providing plant equipment and other resources required for new enterprise and additional employment.

4. Reduction of controllable costs of production and distribution of both durable and consumption goods, to the end prices may be reduced and demand stimulated.

5. Extension of research to the end of developing new and better products at lower prices.

6. Maintenance by each employer of an equitable and fairly applied policy of employer-employe relations.

7. Maintenance of such equitable wage rates as will promote increased production and employment and a higher income to workers. . . reasonable hours of employment . . . the greatest possible regularity of production as a means to continuity of employment . . . where regularity of production is impractical, the greatest possible continuity of employment through reasonable variation of working hours.

8. Enlightenment of the public as to the obstacles which obstruct progress toward the attainment of the foregoing, and as to the measures necessary for the removal of those obstacles—whether in the field of government, labor, management, or elsewhere.

■ H. W. Prentis Jr. (center), president, Armstrong Cork Co., Lancaster, Pa., and new president, National Association of Manufacturers, confers with Howard Coonley (left), chairman Walworth Co., New York, new chairman of the association's board of directors, and Charles R. Hook (right), president, American Rolling Mill Co., Middletown, O., new chairman of the association's executive committee

stitutional democracy was not won fully anywhere in the world until it was won in the United States, said Senator Millard E. Tydings, Maryland. He warned against desire in many quarters to weaken our form of government. Many of the undertakings of our people have been propagandized as failures and the people have been promised that, if government is given the power to deal with these matters, such failures will be avoided in the future.

"Thus," said the senator, "the United States, which it is claimed has really been one gigantic failure so far, is to be made a nation of nothing but successes, all provided for by government."

History teaches, the senator declared, that civilization and prosperity progress directly as government authority is restrained; that human liberty flourishes as the activities of government are curtailed; that constitutional democracy dies in every nation where planned economy takes root and grows.

Shouldn't Avoid Politics

Businessmen are our most notable political defaulters, said George Wharton Pepper, Philadelphia, corporation attorney and former senator from Pennsylvania. Businessmen are the only group within the republic, he said, that thinks it a virtue to eschew politics. He regarded this condition as just as dangerous as many subversive movements currently attributed to aliens.

"In contrast to the point of view of the American businessman," said Mr. Pepper, "I note the farmer, the laborer, the veteran, all recognize the necessity for active participation in practical politics. What is the result? Do you hear attacks made in congress or in fireside talks from the White House on farmers, laborers or veterans? You do not. On the other hand, there is scarcely a day when the American businessman escapes unjust attacks from Washington and elsewhere, and never a day passes that American business does not find itself gasping for breath as taxes increase, as federal investigations hamper and as federal regulations strangle. . . .

"You will be criticized and over-regulated and over-taxed until you adopt the elemental rule of military strategy that an offensive defense is often the only way in which to make any defense at all."

We are witnessing today the terrible consequences of systematic hatred and suspicion directed against racial and religious groups, said Mr. Pepper.

"We are apt to forget that hatred and suspicion of this sort may just as easily be directed against groups other than racial and religious. It easily becomes the fashion to condemn bankers as a class, corporation lawyers as a class and businessmen as a class, and to arouse hatred of citizens who have a perfect right to their own political opinions by applying to them the name 'economic royalists' or some equally contemptuous term . . . . there is no physical acid which has the corrosive power possessed by intolerance directed against persons because they belong to a group that bears a certain name. . . . Movements that begin by stirring up hostility against a group of people end by denying to them all human qualities."

Similar thought was voiced by the Rt. Rev. James E. Freeman, Episcopal bishop, Washington.

"Let us be sure of this: When religious liberty goes, civil liberty goes with it. They stand or fall together. If we yield to alien doctrines, we shall be on the way to a new and more violent form of slavery than we ever have known as a people; it is here in certain places now, and it must be strongly condemned and extirpated."

Will Durant, New York, philosopher, recounted the story of ancient Greece and Rome and said concentration of wealth caused their fall.

This is a fundamental problem in the United States today, he said, and warned businessmen not to consider themselves as successful until the problem has been solved.

"We are on the threshold of a fundamental and far-reaching determination," predicted William L. Batt, president, SKF Industries Inc., Philadelphia.

"Whether the future holds in store for us and posterity a free and competitive form of economy and government, or a system of government ownership, government control and central authority, depends in large measure on what is taking place now and what may occur within the relatively near future."

Mr. Batt expressed his dislike of such terms as "capitalism," "the profit system," the "system of private property," "free enterprise," because all set in motion a chain of thought that misses the main point. He prefers "individual enterprise."

Free Enterprise Aids Progress

National defense depends entirely on industrial capacity and economic strength, declared Gen. Hugh S. Johnson, and our present strange mixture of free enterprise and government regulation is not conducive to enabling us to put forth our best efforts. He fears war, should we become involved, would be used as an excuse to complete government control of industry if certain so-called liberals have their way.

Industry can progress faster in a decade of private enterprise than it can in a century of government control, he said.

W. T. Holliday, president, Standard Oil Co. of Ohio, Cleveland, discussed connection between private enterprise and the abundant life.

Fashion Show for Industrial Congress

Progress made through research and invention under the free enterprise system has opened the door to stockings, clothing, jewelry and novelty wear, boudoir accessories, etc., developed from air, coal and water via the laboratory test tube. Two thousand members of the National Association of Manufacturers, in attendance at the forty-fourth congress of American industry in New York last week, witnessed a fashion show which revealed possibilities of these materials in the feminine world of tomorrow. Photo shows one of the many beautiful models

Privately owned companies constantly must study consumer demands; if they do not they lose their customers. By reducing costs and selling prices, by elevating real wages, private enterprise has made vast contributions to the standard of living in this country, he said.

Discussing opposing ideologies, Walter Lippmann, columnist, declared it now is plain that neither the communists or the fascists have any real principles; they use ideologies to mislead their own and other peoples, to pave the way for approaches on their real objectives. The time has come when totalitarianism no longer is a mere subject for parlor conversation; it must be prevented from getting a foothold here.

"How is business?" was the subject of a panel discussion in which questions were asked by William D. Anderson, president, Bibb Mfg. Co., Macon, Ga., and J. D. Zellerbach, president, Crown-Zellerbach Corp., San Francisco, and answered by David Friday, Lionel D. Edie and Frederick A. Korsmeyer. Highlights:

Recent business improvement formed its roots a year ago and began to manifest itself in May and June. It distinctly is not a war-born improvement, although anticipation of war orders stimulated domestic buying. Recent buying has built up inventories.

See Temporary Setback

Business is at peak and will decline soon, but another peak is in sight later in 1940 or in 1941. General outlook is for somewhat higher average operations in 1940 than in 1939. Most companies are looking forward to activity that will range between 110 and 115 on the federal reserve index. This compares with the present level of approximately 125. Chances are the 1940-41 peak will go as high as 135 or 140.

No revival of the flow of capital into industry on any large scale is expected in 1940. Tax burden now is about 23 per cent of national income; nobody knows what this burden eventually will do to industry. There can be no early return to the profits of 1929, but profit outlook for next two years or more appears good. As a general rule, plant capacity should not be expanded, or should be made with extreme caution to take advantage of technological development. Where expansion is necessary, management should consider amortizing its cost in the price of goods it sells.

A sharp drop, rather than a tapering off, in government spending, would be wholesome. It would lead to a short recession but would stimulate confidence that would lead to vigorous recovery. Unless government spending is reduced drastically, the fear as to what high tax burdens will mean in the next depression will haunt business. Prospects are for reduction in such spending.

Under no circumstances will 1940 see any great increases in commodity prices—and that will be the case no matter whether business volume moves up or down to any extent that now seems possible. Profits will be earned through volume and efficiency rather than through higher prices.

Business Wants No War

Ernest T. Weir, chairman, National Steel Corp., Pittsburgh, and president, American Iron and Steel institute, at a luncheon meeting Thursday reiterated that industry does not want war, from either a humanitarian or economic standpoint.

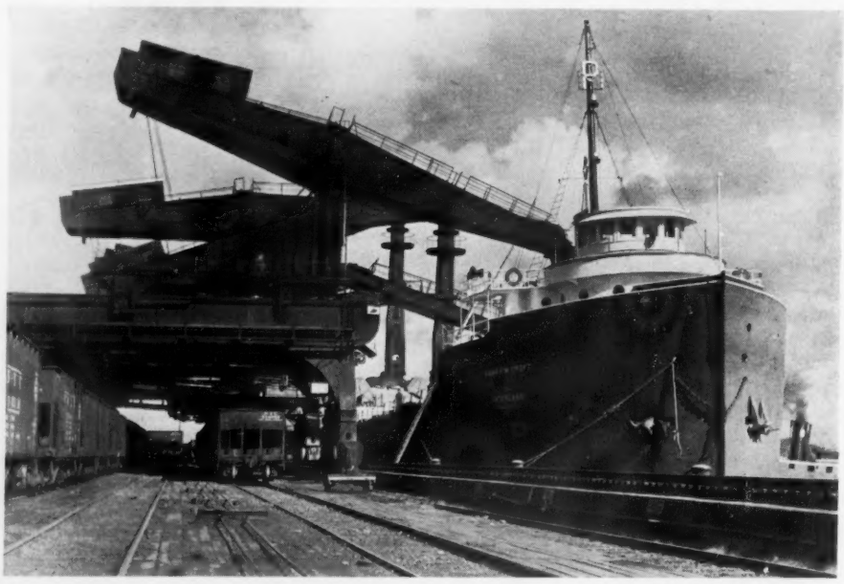
War and war-time controls might mean destruction of democratic institutions, he warned.

After reviewing in detail what happened in the World war, Mr. Weir concluded: "Business knows that a nation cannot fulfill its destiny with the sword. War profits no one; it scourges all. It brings death, depression and the dictator. As day by day, events occur in the world that arouse our emotions, shock our sense of fairness, stir our resentment, let us hold fast to the thought that war solves no problem . . . . It becomes increasingly clear that America must choose peace."

Interstate barriers today are a serious threat that can "destroy the greatest and richest free market in the world" if not checked, said Roy W. Moore, president, Canada Dry Ginger Ale Inc., New York. He likened this trend to the economic nationalism that has disrupted normal economic relations and led to conflict in Europe.

Census figures prove power production and mechanization of industry increased the number of jobs, according to John H. Van Deventer, editor, *Iron Age*, New York. Fear of growing political power, he held, prevents more effective utilization of electrical and mechanical power at this time. One of the causes of our economic slowdown, he held, is the fact that working hours have been shortened too fast; nearly all of the efficiency gains made in industry in recent years have gone to labor in the form of increased leisure, thereby preventing gains in purchasing power through increased production.

Ore Season Closes; 45,066,175 Tons Shipped



■ At the close of navigation Dec. 1, shipments from Lake Superior mines by vessel in 1939 totaled 45,066,175 gross tons, compared with 19,263,011 tons in 1938. Last week an inquiry was issued by Ford Motor Co. for 220,000 tons to be delivered in 1940. It is believed this inquiry foreshadows an active season next year.

Up to Aug. 1 shipments amounted to 15,541,187 tons, about one-third the season's total. By Sept. 1 this was increased to 22,495,767 tons, almost half the total. During the remaining months transportation was speeded up and as much ore was handled as in the preceding five.

A new record was made in cargo size, Inland Steel's L. E. Block loading 15,778 tons. Illustration shows steamer Harry W. Croft, Interlake Steamship Co. fleet, unloading at Ashtabula, O., one of the last cargoes of the season. Photo by Carl McDow, Cleveland.

Ingots Make New All-Time Record

■ NOVEMBER was the second consecutive month in which production of open-hearth and bessemer steel ingots established a new record, according to the American Iron and Steel institute. Output was 5,462,616 gross tons, compared with 5,393,821 tons in October. Prior to October the record month was May, 1929, with $5,286,246 tons.

Production in November was 54 per cent higher than 3,558,363 tons in November, 1938, the best month in that year.

Average operation in November was 93.26 per cent of capacity, compared with 89.17 per cent in October, and 61.81 per cent in November, 1938.

Average weekly production was 1,273,337 tons; 1,217,567 tons in October, and 829,455 in November, 1938.

Production for 11 months aggregates 40,604,479 tons, compared with 24,611,479 tons in the same period of 1938. In the first 11 of 1929 output was 51,409,267 tons.

Corronizing Equipment Will Be Supplied

■ Standard Steel Spring Co., Coraopolis, Pa., United Engineering & Foundry Co., Pittsburgh, and Hanson-Van Winkle-Munning Co., Matawan, N. J., manufacturers of electroplating machines, jointly have concluded negotiations under which United Engineering will make available to licensees of the Corronizing process equipment for that process.

Standard Steel Spring which long has specialized in plating metals, developed the process and already has issued licenses to Carnegie-Illinois Steel Corp., Youngstown Sheet & Tube Co., Republic Steel Corp., Pittsburgh Steel Co., Sharon Steel Corp., and others.

Arrangement will tend to simplify and standardize various parts of the mechanism used in the plating method.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Dec. 9	Change	Same week 1938	Same week 1937
Pittsburgh	94	None	43	19
Chicago	94	None	59.5	24
Eastern Pa.	88	None	37	29
Youngstown	93	+ 1	65	24
Wheeling	93	None	62	30
Cleveland	94	—0.5	66.5	31
Buffalo	90	— 3	49	21
Birmingham	94	None	75	45
New England	90	—10	80	36
Cincinnati	80	None	75	29
St. Louis	83	+ 2	51.5	20.6
Detroit	96	+ 3	86	52
Average	94	None	61	27

Steel Ingot Statistics

	Calculated Monthly Production—All Companies —Open Hearth— Gross tons	Per cent of capacity	—Bessemer— Gross tons	Per cent of capacity	—Total— Gross tons	Per cent of capacity	Weekly production, all companies, gross tons	Number of weeks in month
1939	**Reported by Companies which in 1938 made 98.67% of Open-Hearth and 99.90% of Bessemer.**							
Jan.	3,026,710	54.96	147,642	27.26	3,174,352	52.48	716,558	4.43
Feb.	2,792,267	56.15	196,382	40.16	2,988,649	54.72	747,162	4.00
March	3,210,481	58.30	194,889	35.99	3,405,370	56.30	768,707	4.43
April	2,768,269	51.91	205,977	39.28	2,974,246	50.78	693,297	4.29
May	2,752,549	49.98	170,326	31.45	2,922,875	48.32	659,791	4.43
June	2,937,622	55.08	187,666	35.78	3,125,288	53.35	728,505	4.29
July	2,932,924	53.38	229,610	42.49	3,162,534	52.40	715,505	4.42
Aug.	3,516,219	63.85	247,199	45.65	3,763,418	62.22	849,530	4.43
Sept.	3,933,885	73.94	297,425	56.84	4,231,310	72.41	988,624	4.28
Oct.	4,988,416	90.58	405,405	74.86	5,393,821	89.17	1,217,567	4.43
Nov.	5,057,655	94.83	404,961	77.22	5,462,616	93.26	1,273,337	4.29
11 mos.	37,916,997	63.80	2,687,482	46.10	40,604,479	62.30	850,890	47.22
1938	**Reported by Companies which in 1938 made 98.67% of Open-Hearth and 99.90% of Bessemer.**							
Jan.	1,634,224	30.28	99,941	18.27	1,734,165	29.17	391,459	4.43
Feb.	1,572.009	32.26	125,443	25.39	1,697,452	31.63	424,363	4.00
March	1,846,517	34.21	157,687	28.82	2,004,204	33.72	452,416	4.43
April	1,786,942	34.19	132,100	24.93	1,919,042	33.34	447,329	4.29
May	1,669,455	30.93	131,422	24.02	1,800,877	30.30	406,519	4.43
June	1,513.715	28.96	119,128	22.48	1,632,843	28.36	380,616	4.29
July	1,846,319	34.29	127,998	23.45	1,974,317	33.29	446,678	4.42
Aug.	2,340,363	43.36	196,739	35.96	2,537,102	42.68	572,709	4.43
Sept.	2.440,192	46.80	206,937	39.15	2 647,129	46.09	618,488	4.28
Oct.	2,882,827	53.41	223,158	40.78	5,105,985	52.25	701,125	4.43
Nov.	3,357.167	64.23	201,196	37.97	3.558.363	61.81	829,455	4.29
11 mos.	22,889,730	.....	1,721,749	.....	24,611,479	.....	515,747	47.72
Dec.	2,971.834	55.19	158,912	29.11	3,130,746	52.79	708,314	4.42
Total	25,861,564	40.71	1,880,661	29.20	27,742,225	39.65	532,072	52.14

Percentages of capacity operated for 1939 are calculated on weekly capacities of 1,243,153 gross tons open-hearth ingots and 122,248 gross tons bessemer ingots; total, 1,365,401 gross tons; based on annual capacities as of Dec. 31, 1938, as follows: Open-hearth ingots, 64,817,994 gross tons; bessemer ingots, 6,374,000 gross tons.

Percentages of capacity operated for 1938 are calculated on weekly capacities of 1,218,342 gross tons of open-hearth ingots and 123,514 gross tons of bessemer ingots; total, 1,341,856 gross tons; based on annual capacities as of Dec. 31, 1937, as follows: Open-hearth ingots, 63,524,356 gross tons; bessemer ingots, 6,440,000 gross tons.

PRODUCTION

RATE HOLDS AT 94 PER CENT; MORE REPAIRS NOTED

■ STEELWORKS operations last week remained stationary at 94 per cent. Small increases were reported in three districts and declines in three, six being unchanged. A year ago the rate was 61 per cent; two years ago 27 per cent.

Youngstown, O.—Up 1 point to 93 per cent, one open hearth being added, 69 open hearths and three bessemers being active.

Cleveland — Dropped ½-point to 89.5 per cent as repairs to open hearths lost some time.

Buffalo—Down 3 points to 90 per cent. Two open hearths were dropped for repairs.

Chicago—Slight shifts in active capacity left the rate unchanged at 94 per cent.

Birmingham, Ala.—Steady at 94 per cent, with 22 open hearths active.

St. Louis—Addition of one open hearth by a west side mill raised the rate 2 points to 83 per cent, the best since mid-August, 1937.

Central eastern seaboard—Held at 88 per cent, with a slight reduction indicated for this week.

Pittsburgh—Continued at 94 per cent for the fifth week. Higher operations are expected soon.

Wheeling—Unchanged at 93 per cent, close to practical capacity.

Detroit—Advanced 3 points to 96 per cent, with 24 open hearths in production.

New England—Off 10 points to 90 per cent, due to furnace repairs.

Cincinnati—Held at 80 per cent.

Republic Scrapping Three Blast Furnaces

■ Republic Steel Corp., Cleveland, is scrapping the old Standish blast furnace of the Chateaugay Ore & Iron Co. on Lake Champlain in New York state, and two stacks of the Witherbee Sherman Corp. at Port Henry, N. Y. No. 1 stack at Port Henry was partially dismantled in 1937; No. 2 stack was last blown in 1934. All three were taken over by the corporation for scrapping when it leased ore mining and concentrating properties of Chateaugay and Witherbee Sherman.

Auto Production Revised

■ Subsequent to its report of automobile production for last week, as noted on page 30, *Ward's Reports* issued a revision, raising the total to 115,488 units from 113,298. This resulted from a higher figure for Chrysler, 25,980 instead of 23,790 as first reported.

Canadian Steel, Iron Production Soars; Plants Will Be Expanded

TORONTO, ONT.

■ CANADA'S industrial tempo continues to accelerate in anticipation of war orders and last week brought news of contemplated new plant building and expansion.

Algoma Steel Corp., Sault Ste. Marie, Ont., will double its sheet and tin plate mill capacity, according to Sir James Dunn, president. Sir James said the addition is necessitated by the shutting off of British tin plate imports. Orders for the addition already have been placed with Canadian firms. He stated:

"The tin plate and sheet mill of Algoma Steel Corp. has a capacity of 30,000 tons annually. The unit was completed and put in production a few months ago, representing expenditure of about $2,000,000. The necessity for development to greater capacity was foreseen when the present plant was designed and economic expansion was intended as demands warranted. The war, however, has faced us with the necessity of doing in a few months what otherwise might have taken years to accomplish. Faced with all the business we can possibly handle with present equipment, immediate expansion has become urgent."

From the Northwest come reports a new steelworks may be established in British Columbia. Dr. J. F. Walker, deputy minister of mines for British Columbia, told the mining committee of the Victoria legislature that British capitalists are prepared to establish an iron and steel industry in the province. His department has been making exhaustive studies on power facilities, coal and iron deposits.

Domestic Business Predominates

"There is something afoot now in connection with a steel plant. I cannot say more about it, but British capital was willing to come here at the beginning of the war and, I think, is still willing," said Dr. Walker.

Only a limited number of war contracts have been placed and the orders awarded have had little effect on the dominion's industrial activity. Iron and steel plants, however, stepped up production sharply when the war broke out and many are booked to capacity to year's end. As in the United States, most orders were from domestic consumers who rushed in to cover requirements before war business made early delivery impossible. Backlogs have reached the highest volume in years, and with placing of war orders, expected momentarily, order books will be further expanded.

Ottawa sources indicate awarding of war contracts for Great Britain and Canada on a large scale will be started almost immediately. One of the first will be a shell contract in excess of $5,000,000, which probably will be placed with a big implement company in Toronto. Massey-Harris Co. appears the firm most likely to receive the contract.

Col. J. H. M. Greenley, head of the British purchasing mission in Canada and the United States, said on his return from a visit to Canadian and United States industrial plants, that shells would constitute the bulk of initial orders. It was added that negotiations have been completed for manufacturing projectiles in Canada. Orders will be placed through the Canadian war supply board, headed by Wallace Campbell.

Antisubmarine Boats Ordered

Colonel Greenley said after his tour of plants that many will require special machinery. Private companies will be aided in purchasing new equipment through contracts that will amortize the companies' new plant investment.

Since each company has individual problems, each will be dealt with on its individual merits and this will require considerable discussion and investigation.

One of the largest orders the Canadian board has been asked to execute for the British is for ten steel antisubmarine boats of the "whale catcher" type used by the British navy. Contract totals about $4,000,000. Tenders for 30 of these vessels have been invited from Canadian shipbuilders, the additional 20 being for the Canadian naval service.

Canadian yards may be asked to build freighters, and possibly destroyers or larger warships. A dispatch from London says Sir John Gilmour, shipping minister, is working on plans for speedy augmentation of Britain's merchant fleet to expand trade with Canada and neutral countries. Ships are expected to be purchased from Canadian and neutral builders.

Fleet Aircraft Ltd. has made first delivery of planes ordered earlier this year by the dominion government. Other makers will deliver planes regularly from now on.

How anticipation of war orders and the general industrial stimulation have affected iron and steel production in Canada is revealed in October production figures. Steel ingots and castings production was the highest since 1918. Pig iron output was highest since January, 1930. Comparisons:

	Steel ingots, castings	Pig iron	Ferro-alloys
Oct., 1939	149,890	85,758	6,537
Sept., 1939	124,384	65,954	10,406
Aug., 1939	122,019	65,920	3,313
Oct., 1938	72,256	50,657	2,194
Ten mos., 1939.	1,087,583	573,740	57,355
Ten mos., 1938.	987,261	605,502	44,513

Despite practical capacity operations, new business in the steel markets is slow. This is explained by the fact most buyers are covered to year's end and most mills are sold out to year's end.

While no information regarding new price lists is available, it is generally believed changes will be slight, affect only a few items. Action by United States mills in reaffirming most prices through first quarter supports this belief.

BRITISH COMMISSION PICKS PURCHASING DIRECTOR

Edgar S. Bloom, president, Western Electric Co., New York, will retire from that position this month and become director of purchases for the British Purchasing commission, 25 Broadway, New York, according to Arthur B. Davis, director-general of the commission. Retiring in accordance with a company rule providing that all employes leave active service at 65, Mr. Bloom will have completed 43 years with the Bell Telephone system.

F. Johnson, vice president, Bell Telephone Co. of Canada, has been appointed the commission's director of administration. Born in England, Mr. Johnson went to Canada and entered Bell Telephone Co.'s service in 1910. Since then he has held various executive positions.

Copperweld Steel Offers Preferred Stock Issue

■ Copperweld Steel Co., Glassport, Pa., is making public an offering of 10,000 shares cumulative convertible preferred stock, 5 per cent series, at $50.50 a share. Proceeds will be used to redeem certificates of indebtedness due in 1946-47, of which $198,768 was outstanding Oct. 31. Repayment of part of $500,000 bank loan is also planned.

Company simultaneously announces new issue of $2,000,000 in 4½ per cent first mortgage 15-year bonds to finance construction of new alloy steel plant at Warren, O. Portion of proceeds from bond sale will be used to repay balance of bank loan.

Upon completion of scheduled refinancing company's outstanding capitalization will be $2,000,000 in first mortgage bonds, 50,000 par $50 preferred shares and 431,714 common shares.

Dedicates New Machine Plant

■ LANDIS TOOL CO., Waynesboro, Pa., held open house Dec. 2-3, on completion of its 125 x 450-foot plant addition.

This steel, concrete and glass building, which will be used as an erecting shop, is equipped with four 10-ton and one 20-ton cranes. The largest "down draft" spray painting stand in the United States which requires no booth is built into its floor.

In "window walls" and skylights there are altogether 17,000 large panes of light diffusing glass. Artificial lighting is provided by 170 1000-watt lamps, giving 42 foot-candles of illumination at normal working height throughout the entire building.

Began in 1889

Development of Waynesboro into an important machine tool center started in 1889 when A. B. and F. F. Landis, as Landis Bros., began manufacturing cylindrical grinders in a 30 x 60-foot shop. Following a disastrous fire in 1897, the people of Waynesboro rallied to the enterprise. Thereupon the present Landis Tool Co. was organized. J. E. Frantz, now president of the company, began work for Landis Bros. in 1890.

Today this company has the largest plant in the United States devoted exclusively to manufacturing precision grinding machines. There are about 650 stockholders, practically all of whom live in Waynesboro, many being employes. The company has 1500 workers, and is of major importance to the community. During the open house nearly 10,000 persons toured the plant and congratulated its officials, demonstrating that "Landis and Waynesboro get along well together."

These visitors were shown how precision grinding machines are designed and built. The importance of modern machine tools was demonstrated by means of ingeniously arranged exhibits. Among those cooperating in the exhibits were the Landis Machine Co. and the Frick Co., Waynesboro. Each visitor was presented an illustrated book covering history, products, policies and personnel, from which the following is quoted: "The Landis Tool Co. believes that experience is only acquired with age, and as proof of this over 34 per cent of the total number of employes of this company are over 40 years of age. Twenty-one persons have been employed from 30 to 39 years, three have been employed between 40 and 50 years; the oldest employe is 81."

Hints SWOC Drive for Closed Shop, Checkoff

■ Philip Murray, chairman, Steel Workers Organizing committee, last week in Pittsburgh complained nondues paying members are receiving all the union benefits without sharing the burden. He indicated a campaign will be started soon to eliminate this "aggravation" to union officials and paying members. Remedy to be sought: Closed shop and checkoff.

■ **Landis Tool Co.'s plant at Waynesboro, Pa. The addition, dedicated last week with an open house attended by 10,000, is in the foreground. Aerial photo by Hugh N. Rocks, Waynesboro**

Bethlehem Labor Policies Restated

■ CONTRARY to reports emanating from Pittsburgh, Bethlehem Steel Co. has not revised its labor policies, but has clearly restated its position in a letter to Clinton S. Golden of the Steel Workers Organizing committee. Letter, signed by George W. Vary, manager of industrial relations, follows:

"Your letter to Mr. Eugene G. Grace, dated Nov. 18, 1939, has been referred to me for reply.

"The organization which you represent has been advised many times, directly or in proceedings before the national labor relations board, as to the manner in which collective bargaining at the respective plants of this company has been and is from day to day being handled. The management at each plant handles locally all matters relating to relations between its employes there and the management. For that purpose there is at each plant as a part of its permanent organization an officer known as the management's representative whose duty it is to, who has full authority to, and in fact does, represent the management at such plant in negotiation with employes or their representatives on all questions relating to wages, hours and working conditions that arise at such plant and are not satisfactorily settled by the foreman or immediate superior of the employe."

Wage Policy Declared

Bethlehem's wage policy was set forth in the current issue of the *Bethlehem Review* as follows: "Bethlehem's wage policy is to pay wages that are as high as possible consistent with responsibilities to all concerned. In carrying out that policy, it has paid and is now paying at its plants and properties wage rates equal to or higher than those paid by its competitors and other industries operating in the locality in which it operates for comparable work and under conditions requiring equal skill and efficiency."

SWOC has been making a number of demands at Bethlehem such as the 8-hour day and the 40-hour week, which already are in effect in the company's plants. Overtime pay for over 8 hours a day or 40 hours a week is time and a half.

Hourly earnings average 91.2 cents (for all Bethlehem employes in the United States in 1938) and daily earnings, exclusive of all general office, administrative and selling forces, average $7.03. Other employment conditions were noted in STEEL, Nov. 27, page 23.

MEN OF INDUSTRY

■ B. H. GEDGE, manager of operations, Cleveland district, American Steel & Wire Co., has been appointed assistant to the vice president in charge of operations. A. J. Hoyt, assistant manager of Worcester, Mass., district operations, has been made manager of operations at Cleveland, succeeding Mr. Gedge. Mr. Gedge succeeds W. F. Munford, who has been named assistant manager of operations at Pittsburgh.

Peter Stewart, superintendent of South works, Worcester, succeeds Mr. Hoyt as assistant manager, Worcester district; G. A. Gleason has been named general superintendent, South works, while L. J. Westhaver has become superintendent of the steelworks, and F. P. Leahey, superintendent of the wire mill, both at South works.

Except for a short period in the West, Mr. Gedge has spent his entire business career with American Steel & Wire in Cleveland. Starting as an electrician at the Cuyahoga works in 1911, he advanced through various positions becoming superintendent at Cuyahoga in 1935 and manager of Cleveland district in 1937. Mr. Hoyt joined the Wire company in 1914 as assistant foreman at the Trenton, N. J. plant.

♦

C. W. Schefer has been appointed purchasing agent, A. Milne & Co., New York.

♦

Samuel W. Gray has been made general manager, Marvel-Schebler Carburetor division, Borg-Warner Corp., at Flint, Mich. Carl M. Kaltwasser, former general manager now is attached to the general office of the corporation.

♦

Donald Wills Douglas, founder and president, Douglas Aircraft Co., Santa Monica, Calif., has been awarded the Daniel Guggenheim medal for 1939, by the Institute of Aeronautical Sciences, "for outstanding contributions to the design and construction of transport airplanes."

♦

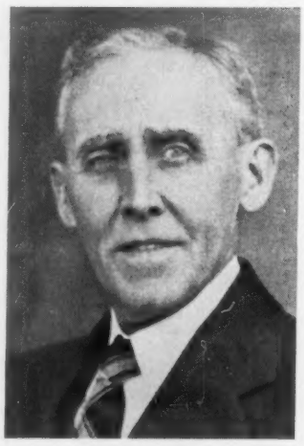
Dr. Oliver E. Buckley, executive vice president, Bell Telephone Laboratories, New York, has been elected chairman, Engineering Foundation, New York. Formerly vice chairman of the foundation, Mr. Buckley succeeds the late Prof. George E. Beggs, of Princeton university.

♦

Arthur R. Elsea, a recent graduate of Ohio State university, has joined the research staff of Battelle Memorial institute, Columbus, O., and will assist in a fundamental study of cast iron metallurgy. He is a member, American Institute of Mining and Metallurgical Engineers and American Society for Metals.

B. H. Gedge

A. J. Hoyt



Peter Stewart

♦

F. J. Wurcher has recently become associated with the Acme Steel & Malleable Iron Works, Buffalo, in a metallurgical capacity. He was formerly with Stanley G. Flagg & Co. Inc., Philadelphia.

♦

R. W. Towne has been elected assistant secretary, Worthington Pump & Machinery Corp., Harrison, N. J. Following graduation from Cornell university in 1924, Mr. Towne joined Moore Steam Turbine Corp., Wellsville, N. Y., a Worthington subsidiary, becoming secretary and assistant treasurer in 1936.

♦

S. K. Oliver, for a year and a half process metallurgist and supervisor of heat treating operations, Electro-Motive Corp., La Grange, Ill., and for several years prior to that metallurgist, Delco Products division, General Motors Corp., Dayton, O., is now process engineer, Douglas Aircraft Co. Inc., Santa Monica, Calif.

♦

R. J. Teeple, formerly district sales manager, Atlanta, Ga., for Page Steel & Wire division of American Chain & Cable Co., Bridgeport, Conn., has been made district sales manager for the division at New York, with headquarters at 230 Park avenue. S. R. Hawkins, heretofore with the Pittsburgh office, succeeds Mr. Teeple at Atlanta.

♦

Irving E. Perrin, the past five years Pacific coast manager for Ingalls Iron Works Co., Birmingham, Ala., and before that vice president and general sales manager for Pacific Coast Engineering Co., Oakland, Calif., 15 years, has been named Pacific coast manager for Byrne Doors Inc., Detroit, with headquarters at 666 Mission street, San Francisco.

♦

F. H. Fowler has resigned as president and general manager, Foote Bros. Gear & Machine Corp., Chicago, to become assistant to president and chief operating executive, American Machine & Metals Inc., Moline, Ill., and New York. He will continue as a director of Foote Bros. and as chairman of the executive committee. W. A. Barr, vice president in charge of manufacturing of Foote Bros., has been elected executive vice president and general manager of the company.

♦

A. G. Montgomery, superintendent of hot mills, Cuyahoga works, American Steel & Wire Co., Cleveland, has been appointed assistant chief engineer for the company, succeeding F. R. Burnette, recently transferred to Carnegie-Illinois Steel Corp. F. W. Lorig has been named engineer for appropriations and properties, W. V. Magee has become construction engineer, and F. E. Robinson, assistant construction engineer. Mr. Montgomery joined the Wire company in 1914 as a dis-

trict engineer, and since that time has held a variety of engineering positions. Mr. Lorig has been with the company since 1915. Mr. Magee, heretofore assistant construction engineer, joined the company in 1927, while Mr. Robinson has been with the company ten years, and formerly was section head draftsman.

♦

C. A. Boughner has been made director of safety, sheet and tin mills, Carnegie-Illinois Steel Corp., Gary, Ind. R. A. Critten has been appointed general foreman of the continuous pickler, and W. P. Jones has become assistant superintendent of industrial relations. Mr. Boughner, whose service at the sheet and tin mills began in 1935, was formerly general foreman of the continuous pickler. Mr. Critten began as a clerk at the 42-inch hot strip mill in 1933. The past two years he has been assistant superintendent of industrial relations. Mr. Jones, heretofore industrial engineer, was first employed at the sheet and tin mills in 1936.

♦

Edward M. Sansom, formerly with the New York office of Electric Storage Battery Co., Philadelphia, has been appointed district sales manager, Whitcomb Locomotive Co., Rochelle, Ill., with offices at 120 Broadway, New York. B. L. Beck, formerly with Fate-Root-Heath Co., has been named district sales manager at St. Louis for the Whitcomb company, while John R. Heckman, previously with Midvale, has joined Whitcomb's Chicago sales department.

♦

Northern New York mining operations of Republic Steel Corp. have been consolidated into the Adirondack district, with J. R. Linney as district manager. Mr. Linney was vice president, Chateaugay Ore & Iron Co. prior to the time the property was leased by Republic this spring. He then specialized in the sale of Chateaugay iron for Republic and this will now be handled through the pig iron sales division headed by C. E. Hilkert.

R. J. Linney has been made general superintendent of the Port Henry division, and W. J. Linney, general superintendent of the Chateaugay division. T. F. Myners will be assistant general superintendent, Port Henry division.

♦

Gus Gillerman, Gus Gillerman Iron & Metal Co., St. Louis, has been elected president, St. Louis chapter, Institute of Scrap Iron and Steel Inc., succeeding Harry J. Kiener, Hickman, Williams & Co. Inc., St. Louis, retired. Clarence C. Cohen, I. J. Cohen & Co., Kansas City, Kans., has been elected first vice president; Hyman Cohen,

C. A. Boughner

Standard Steel & Rail Co., St. Louis, second vice president; Abe P. Ashner, St. Louis, third vice president; Fred S. Fuld, Harry Benjamin Equipment Co., St. Louis, has been re-elected secretary-treasurer.

♦

G. M. Harris, superintendent of blast furnaces, Ensley works, Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., has been promoted to assistant general superintendent. W. D. Harris, assistant superintendent of blast furnaces at the company's Fairfield works, becomes superintendent of those furnaces. J. A. Maxwell has been elevated from assistant superintendent to superintendent of blast furnaces at Ensley. J. J. Shannon, turn foreman in the cold reduction department of the Fairfield tin mill, succeeds W. D. Harris as assistant superintendent of blast furnaces at Fairfield. John R. Hunt, practice man at the Ensley blast furnaces, succeeds Mr. Maxwell as assistant superintendent there.

DIED:

■ FRANK R. McGEE, 66, inventor of McGee thermal expansion goggle valve and open checkers for hot blast stoves, in Mercer, Pa., Dec. 5. Prior to his retirement last Jan. 1 he had been chief mechanical engineer at the Mingo works of Carnegie-Illinois Steel Corp. since 1905. He was a member, American Iron and Steel institute, American Society of Mechanical Engineers, Engineers Society of Western Pennsylvania.

♦

George L. Crosby, 56, vice president and general sales manager, Roller-Smith Co., Bethlehem, Pa., at his home in that city, Dec. 2.

♦

Robert Terry Wolfe, 64, vice president and general manager, Superior Mfg. Co., Davenport, Iowa, manufacturer of sheet metal products, in that city, Nov. 26.

♦

Albert E. Harris, many years a salesman for Brown & Sharpe Mfg. Co., Providence, R. I., in that city, Nov. 30. He served in the manufacturing and sales departments of Brown & Sharpe over 40 years.

♦

Fred J. Miller, 82, industrial engineer and former president, American Society of Mechanical Engineers, Nov. 26 in Orthopedic hospital, Trenton, N. J.

♦

Howard C. Russ, 67, president and a director, Beach-Russ Co., New York, maker of rotary pumps, Nov. 29 at his home in Groton, Conn. He also was president and a director, Abbe Engineering Co., New York.

♦

D. Harry Friedman, 74, former president, United American Iron & Steel Co., in Miami, Fla., Nov. 28. Mr. Friedman also held positions with Page-Hersey Tubes Inc., Toronto, Ont., and was executive vice president, Cohoes Rolling Mills, Cohoes, N. Y.

♦

William Walker, 88, former director and treasurer, Harbison-Walker Refractories Co., Pittsburgh, Nov. 28. Mr. Walker, who retired about 15 years ago, joined the refractories company in 1894.

♦

Paul R. Bargar, 58, president, Bargar Sheet Metal Co., Cleveland, in that city, Dec. 5. He had been associated with the sheet metal business in Cleveland 30 years, and was a former president, Sheet Metal Contractors association.

♦

C. J. Braun Jr., 67, treasurer, Philadelphia Co. and subsidiaries, 40 years, in Pittsburgh, recently. At one time he was secretary and sales manager, Oliver Iron & Steel Co. and also was secretary to the general manager, Westinghouse Electric & Mfg. Co.

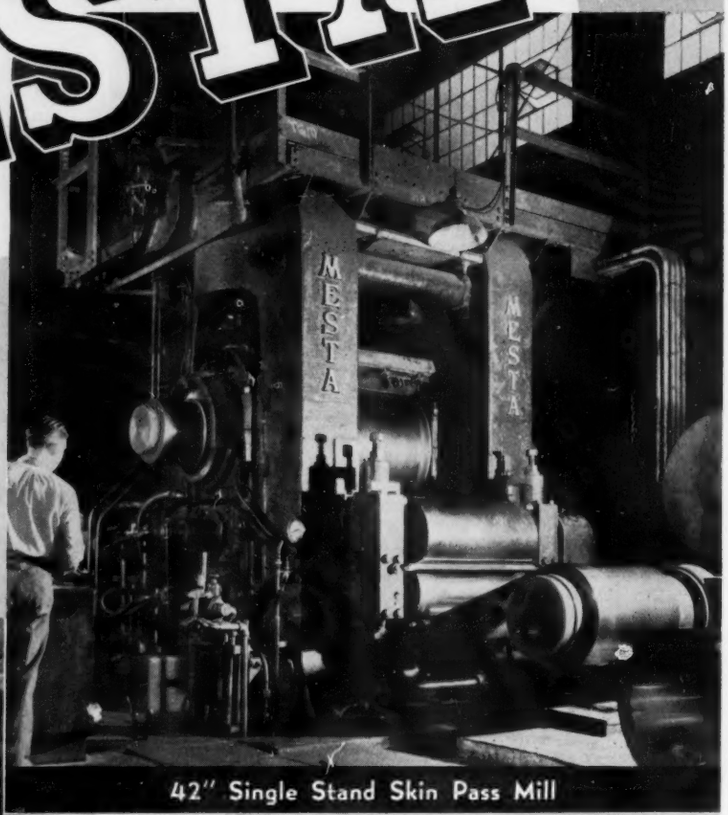
♦

William D. Pierson, 67, secretary and director, Waterbury Farrel Foundry & Machine Co., Waterbury, Conn., in that city, Dec. 2. He joined the company's engineering staff in 1895. He was a director, National Wire Machine Builders association.

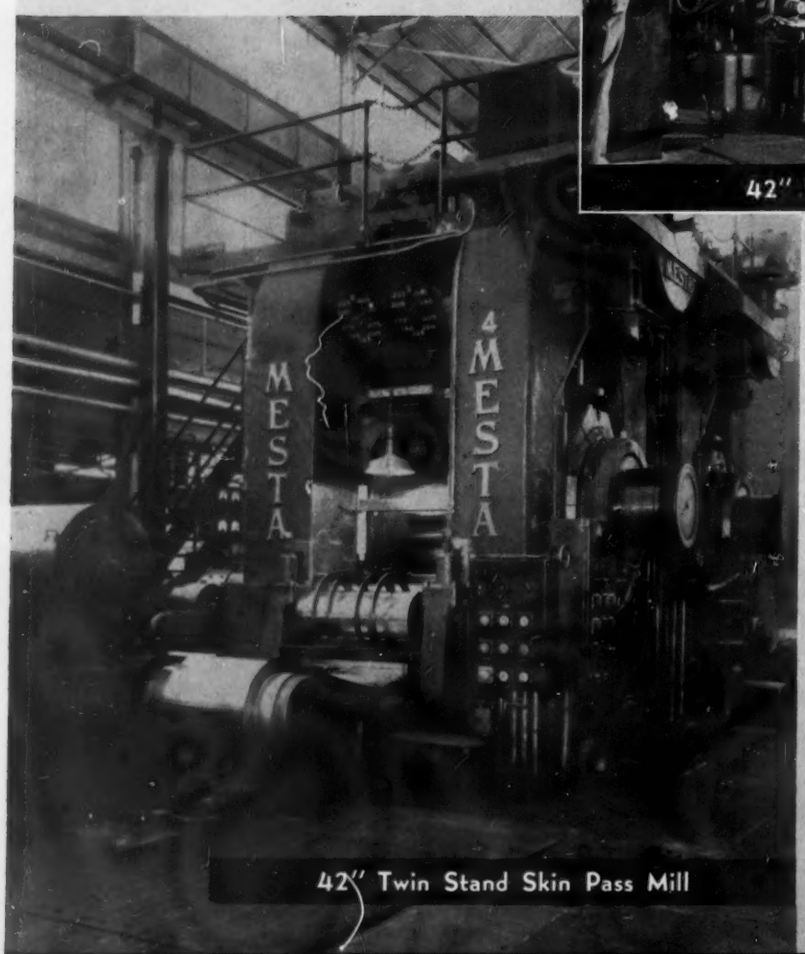
♦

Clement W. Inglis, 76, former secretary-treasurer, Milwaukee Steel Foundry Co., in Milwaukee, Nov. 24. He helped organize the foundry firm in 1904. From 1927 until his retirement in 1937 he was associated with the engineering department of Heil Co., Milwaukee. He was a member, American Foundrymen's association.

MESTA



42" Single Stand Skin Pass Mill



42" Twin Stand Skin Pass Mill

FOUR-HIGH

SINGLE STAND AND TWIN STAND

SKIN PASS MILLS FOR TIN PLATE

MESTA MACHINE COMPANY · PITTSBURGH, PA.

Windows of WASHINGTON

By L. M. LAMM
Washington Editor, STEEL

WASHINGTON

■ TNEC last week listened to discussion of current commodity prices by government experts, purchasing officers of both government and industry and business men.

The hearing was held in connection with a request sent to the committee by the President asking it to keep in touch with the price situation. Senator O'Mahoney, chairman of the committee, may use this Presidential letter as a handle to get appropriations at the coming session of congress for continuing the committee's work.

Dr. Isador Lubin, commissioner of labor statistics, labor department, testified some important changes in the price structure have occurred since September. He said the price of zinc has increased 40 per cent, which in turn has its effect on the cost of producing galvanized steel.

Higher Prices Seen

Dr. Lubin stated "if the past is any forecast of the future, and if the present European war should be prolonged, United States will be faced with a raise in prices of many important commodities and a subsequent period of economic readjustment."

He pointed out that the situation confronting the United States now is different from that which prevailed prior to the American entry into the World war. He said industry in this country now has greater capacity and is more adaptable to the use of subsequent products.

Another witness was Dr. Willard L. Thorp, special adviser to the secretary of commerce.

"In many ways," Dr. Thorp said, "the present situation is quite different from that of the World war, yet many of the same dangers are present. The immediate result of the new war was a tremendous, almost instantaneous, increase in new orders, not only in heavy industries such as iron and steel, but also for such products as textiles leather, and foodstuffs.

"A quick step forward in many wholesale prices was the result. That this was a temporary boom is evident in return of new orders to more normal levels and the downward adjustment of wholesale prices. Support for the new level of production must come from basic increases in the demand for goods."

He said that from the public point of view there are a number of reasons for questioning if the higher profits now being recorded will be rapidly translated into capital expansion.

Dr. Thorp told the committee "the United States was on a moderate upswing in business conditions when war broke out. It is difficult to keep in adjustment when abnormal demands over-stimulate one part or another of the system. We cannot avoid considerable impact from the shifts in world requirements; however, it is by no means necessary that this result in distortion of the price pattern, and the rise in price which occurred in the World war. One high cost of war is the difficulties of adjustment thereafter. These are greatly accentuated if policies permit acute price movements to occur."

BEGIN SALES, ORDERS, INVENTORIES SURVEY

About 2000 copies of a questionnaire are being sent out by the department of commerce in a new survey. Leading steel companies and machine tool manufacturers are included. Whether it will be continued depends on the answers received.

Information is wanted for June, October and November of this year, and November 1938, covering net sales for each month; new orders received during the month; unfilled orders at end of month; and value of inventories at end of month. Subdivisions in this latter question include raw materials, goods in process, finished goods and fuel and shop supplies.

Department explains that by net sales is meant invoiced shipments less discounts, returns, allowances, excise taxes and other deductions.

Decision to undertake this work was made after the business advisory council of the department and business men had indicated need for such information.

COMMITTEE TO START LABOR BOARD PROBE TODAY

Special house committee to investigate the national labor relations board will begin hearings Dec. 11, with William M. Leiserson, a board member, expected to be the first witness. Fifteen other employes of the board have been notified they will be called to testify. In all, about 30 witnesses will be called.

Hearings will continue until the Christmas recess.

PROFIT-LIMITING WAR CONTRACT OUTLINED

Treasury department, acting under section 3760 of the internal revenue code, has signed a closing agreement with the Colt's Patent Fire Arms Mfg. Co., stipulating how certain items will be handled in computing company's profit on a war contract. Contract is subject to profit limiting provisions of the Vinson-Trammell and national defense acts. This is first closing agreement pertaining to these acts.

It provides, that the company may charge off as an indirect factory expense cost of special tools, jigs, dies, fixtures and gages which it must acquire to carry out the contract, and are useful only for this particular work. Before making the agreement, war department made certification to the treasury of the necessity for such tools, jigs, etc., and also is to certify to the treasury the amount of such tools, so acquired and used. Although there

is no expectation the special equipment will be used except on this contract, to provide against any unforeseen contingencies, closing agreement provides; if these special tools are used on other work, an allocable portion of their cost shall be charged against the other work and the deduction allowed for profit limitation purposes shall be reduced accordingly.

Provisions for Other Machinery

As to certain standard machinery, other than the special tools, which company must install to perform contract, agreement provides company will be permitted to charge off 10 per cent of the cost each year as a depreciation allowance. This portion of the closing agreement contains an additional proviso stating, if upon completion of contract fair market value of such standard machinery is less than one-half of the reasonable cost of machinery, company will be allowed a further deduction equal to the difference between the fair market value and one-half such cost. Deductions allowed regarding standard machinery are not permitted to be treated as direct charges against the contract but are to be pro-rated to all work on which the machinery is used.

URGES CONGRESS TO TIGHTEN PURSE STRINGS

In cutting government expenses United States chamber of commerce is suggesting congress should overhaul its taxing and spending procedure to tighten up its control of government purse strings. Proposal is made for creation within congress of an agency such as a central budget committee, which would consider and report upon the budget situation as a whole soon after receipt of the executive estimate for each fiscal year. Agency then would recommend total expenditures before congress adopted numerous authorization and appropriation measures.

This central budget agency would not deal with details but would consider totals and general financial situation. Total of detailed amounts later recommended by committees should not exceed grand total agreed upon by congress.

"Such an agency would not supplant the existing appropriation committee and revenue-raising committees," the chamber says.

"This procedure would provide congress with a better picture of fiscal operations. It would enable the public to understand financial affairs of the government. It would encourage resistance to new or enlarged appropriations urged by special-interest or pressure groups, and it would contribute to formulation of better fiscal policies in protection of taxpayers and of government credit."

UNITED KINGDOM LIFTS DUTY ON IRON AND STEEL IMPORTS

Principal iron and steel products imported subject to import quota since 1936, and dutiable at 10 per cent ad valorem instead of varying rates of 20 per cent to 33 1/3 per cent ad valorem applicable to goods in excess of quota, may now be imported free of duty, according to the United Kingdom board of trade.

Main categories which become subject to free entry: Pig iron not already duty free; ingots; blooms, billets, slabs; girders, beams, joists, pillars, whether fabricated or not; angles, shapes, sections, whether fabricated or not; colliery arches, pit props; bars, rods; plates, sheets; hoop, strip not already duty free; railway, tramway rails; wire (including barbed wire), wire cable and rope; upholstery and mattress wire springs; screws for wood, whether coated or plated or not.

Reason for exemption is the rising price level in principal supplying countries, which is now generally higher than the controlled price level in the United Kingdom, thus causing difficulty in obtaining supplies to advantage.

Board of trade also announces principal iron and steel products, including those exempted, and principal raw materials used in manufacture of iron and steel will almost immediately be placed on list of goods requiring import licenses.

1940 TIN PLATE SCRAP RULES RELEASED

State department has announced applications for tin plate scrap exports will be received not later than Dec. 20.

Rules of procedure to govern issuance of licenses for tin plate scrap during the calendar year 1940 have been announced. Regulations provide each producer of tin plate scrap who desires to export during the calendar year 1940, as well as every producer whose scrap is sold to and ultimately exported by third parties, must submit a request for an allotment to the secretary of state not later than Dec. 20, specifying in long tons quantity of tin plate scrap which he desires to export or to sell for export between Jan. 1 and Dec. 31, 1940.

Allotments will be based on the individual producer's request, with provision no allotment of more than 25 long tons shall exceed in amount 20 per cent of the quantity of tin plate scrap produced by him during the calendar year 1938. Requests for allotments of 25 long tons or less may be granted in full, without reference to the quantity of tin plate scrap produced during the calendar year 1938, provided producer concerned presents convincing evidence. No allotment assigned under the provisions of this paragraph to any one producer, including his affiliated or associated companies, shall exceed 2000 long tons.

GOVERNMENT PURCHASES OF IRON, STEEL TOTAL $3,527,523

During the week ended November 25, government purchased $3,527,523.77 worth of iron and steel products under the Walsh-Healey act as follows: Henry G. Thompson & Son Co., New Haven, Conn., $19,321.20; William Scrimgeour, Washington, $62,861.12; Enterprise Foundry Co., San Francisco, $14,500; Colorado Fuel & Iron Corp., Denver, $39,057.26; Sheffield Steel Corp., Kansas City, Mo., $17,940; Republic Steel Corp., Sand Springs, Okla., $57,593.75; American Safety Razor Corp., Brooklyn, N. Y., $13,493.38; Bethlehem Steel Co., Bethlehem, Pa., $2,545,095.68; Bridgeport Thermostat Co., Bridgeport, Conn., $22,965.81; Louisville Tin & Stove Co., Louisville, Ky., $22,814.90; American Bridge Co., Denver, $85,874; Bethlehem Steel Export Corp., New York, $407,705 (estimated); American Chain & Cable Co., Wilkes-Barre, Pa., $13,210; Crucible Steel Co. of America, New York, $18,040; and United States Steel Export Co., Washington, $187,050.67.

UPHOLDS ANTITRUST LAWS AS APPLIED TO LABOR

Attorney General Frank Murphy has sent a letter to William Green, president, American Federation of Labor, stating the application of antitrust laws as applied to activities of labor organizations and their members is the same as that applied to business. He says:

"In a recent letter you have inquired whether it is the view of the department of justice the antitrust laws apply to the activities of labor organizations and their members. In reply it is only necessary for me to point out that it has been so held in several decisions of the Supreme Court. In the Chicago milk case now pending in the Supreme Court, your general counsel, Joseph Padway, conceded this to be true and frankly asked the Supreme Court to overrule its former holdings.

"In the enforcement of criminal statutes it is the practice of the department to follow the construction placed on them by the Supreme Court. In doing so in this instance, the antitrust division has followed the usual practice, and I would not be justified in interfering with that course."

Leadership in Manufacture Depends On Objectively Trained Engineers

■ A STRONG appeal to industry to develop an objective training program for young mechanical engineers was expressed last week at the sixtieth annual meeting of the American Society of Mechanical Engineers in Philadelphia.

"There is need at the present time for bold initiative, masterful invention, and new production methods that will lower costs, if American leadership in manufacture is to be maintained," declared Alexander G. Christie, professor of mechanical engineering, Johns Hopkins university, Baltimore, and president of the society. "Since industry looks to the enthusiastic young men from engineering schools to meet these needs, the post-graduate training of such young engineers is a matter of great national importance and an immediate responsibility of industry."

Prof. Christie's remarks, made at the annual dinner, climaxed what was perhaps the most comprehensive program in the history of the society, covering a diversity of engineering, administration, and research problems and which included 34 group sessions, presentation of approximately 100 technical papers

James E. Gleason
Awarded A.S.M.E. Medal "for service to the cause of safer and better transportation"

and inspection trips to almost a score of plants in the Philadelphia area.

It was the first annual meeting the society has held outside of New York since 1890 and was the first national one in Philadelphia since 1887. It was held at the Bellevue Stratford hotel, Dec. 4-8, and was attended by approximately 3000 executives and engineers, a gathering comparable to the one of last year.

Of special interest to the steel and metalworking industries, were sessions on iron and steel, machine shop practice, instruments, railroads, work standardization, management, industrial marketing and

Warren H. McBryde
Installed as president, American Society of Mechanical Engineers

education and training. The Towne and Thurston lectures were not included in this year's program.

Because of the many social functions planned, the 1939 honors and awards of the society were bestowed at the annual dinner. The A. S. M. E. Medal was awarded to James E. Gleason, president, Gleason Works, Rochester, N. Y., "for service in the cause of safer and better transportation;" and the Worcester Reed Warner Medal to Dr. Rupen Eksergian, consulting engineer, Edward G. Budd Mfg. Co., Philadelphia, "for industrial engineering papers of permanent value published in the *Transactions* of the A. S. M. E.

Other Awards Presented

The Pi Tau Sigma Medal was awarded to John I. Yellott, assistant professor, Stevens Institute of Technology, Hoboken, N. J., with the citation, "outstanding young mechanical engineer of 1939."

The Charles T. Main Award of $150 went to James R. Bright, Swampscott, Mass., graduate of Lehigh university and now a student engineer, General Electric Co., Schenectady, N. Y., for his paper, "The Economics of Investment in New Manufacturing Equipment — With Concrete Cases."

Presentation of the Holley Medal to Dr. Carl Edvard Johannson, Eskilstuna, Sweden, "in recognition of his pioneer work in the development of basic measuring gages," originally planned for this meeting, was postponed until the June meeting in Milwaukee.

Warren H. McBryde, consulting engineer, San Francisco, was formally introduced as president of the society for 1940, to succeed Prof. Christie. Also introduced were four new vice presidents: Kenneth H. Condit, executive assistant to president, National Industrial Conference board, New York, and who after Sept. 1 will be dean of engineering, Princeton university; Francis Hodgkinson, consulting engineer and honorary professor of mechanical engineering, Columbia university, New York; J. C. Hunsaker, head of department of mechanical engineering, Massachusetts Institute of Technology, Cambridge, Mass.; K. M. Irwin, assistant to vice president in charge of engineering, Philadelphia Electric Co., Philadelphia.

Newly elected managers include: J. W. Eshelman, president, Eshelman & Potter, Birmingham, Ala.; Linn Helander, head of mechanical engineering department, Kansas State college, Manhattan, Kans.; and G. T. Shoemaker, president, United Light & Power Service Co., Chicago.

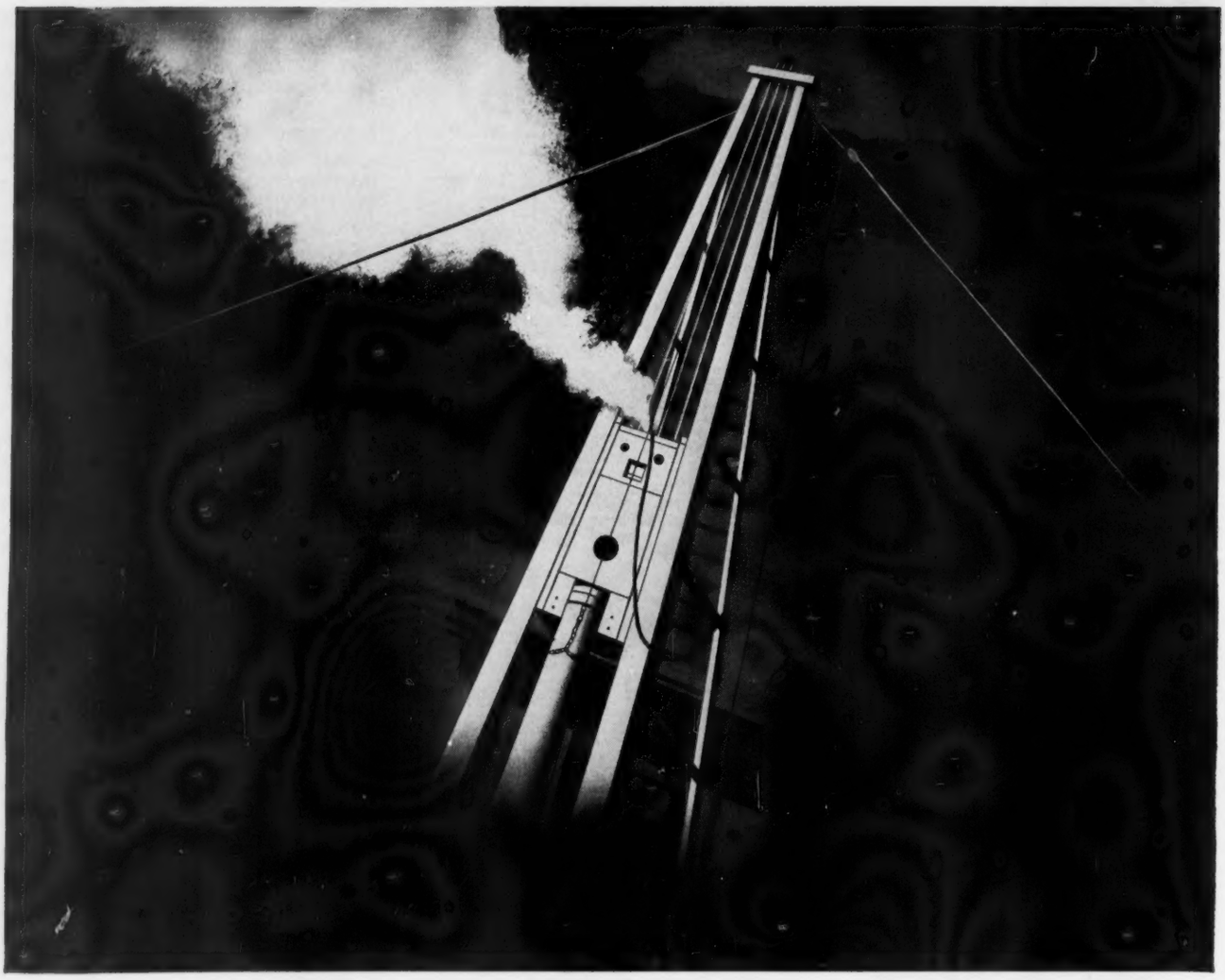
In honor of its 6000 student members, the society designated Dec. 6 as student day, with a general session in the morning, a luncheon, and visits to industrial plants in the afternoon.

In proposing a training program

Dr. Rupen Eksergian
Recipient of Worcester Reed Warner Medal of American Society of Mechanical Engineers

for graduate engineers in industry, Prof. Christie enumerated the following definite objectives: "(a) Self-confidence of our engineers based upon thorough technical instruction, (b) their aggressive initiative through encouragement by industry both in original invention and design, and in the introduction of new

(*Please turn to Page* 78)



PILE DRIVERS CAN'T CALL "TIME OUT"

When a pile driver goes to work time is generally the essence of the contract, with penalties for non-fulfillment an ever-present threat. Hence the ability to give continuous service under difficult conditions and with a minimum of attention is an essential requirement. That, in turn, depends largely on the choice, for each part, of the material best adapted to the job.

One manufacturer, whose pile drivers have made an enviable record for trouble-free performance, guards dependability by making the ram piston — a vital part — of Nickel-Chromium-Molybdenum Steel. This steel develops to a high degree the particular combination of toughness, strength and hardness, in the heavy sections used, which is necessary to withstand the rigors of the service.

A re-check of your own materials specifications may disclose possibilities for increasing dependability by the use of Molybdenum Steels. You will find our technical booklet, "Molybdenum in Steel", helpful. It will be sent free on request.

PRODUCERS OF MOLYBDENUM BRIQUETTES, FERRO-MOLYBDENUM, AND CALCIUM MOLYBDATE

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MOLY

Mirrors of MOTORDOM

By A. H. ALLEN
Detroit Editor, STEEL

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DETROIT

■ CHRYSLER plants whirled back into production with breath-taking speed following settlement of the strike controversy. With characteristic rush and with no eye to the time of day or night, planning departments set in motion their vast machinery and the rivers of materials and parts began to flow once more to Dodge, De Soto, Plymouth and Chrysler. Some quiet preparations had been made a day or two in advance of the return of the main body of workmen, so that when they resumed their posts everything was ready. As an example of the speed with which production was resumed, Dodge turned out 2300 cars in a little over two days.

Two hours after the starting whistle blew a week ago Thursday at the De Soto plant, new cars were rolling into the plant yard ready for shipment. By Saturday about 1000 cars had been completed. Requisitions had previously gone out for freight cars equivalent to a solid trainload for every working day, in addition to 850 transport trucks.

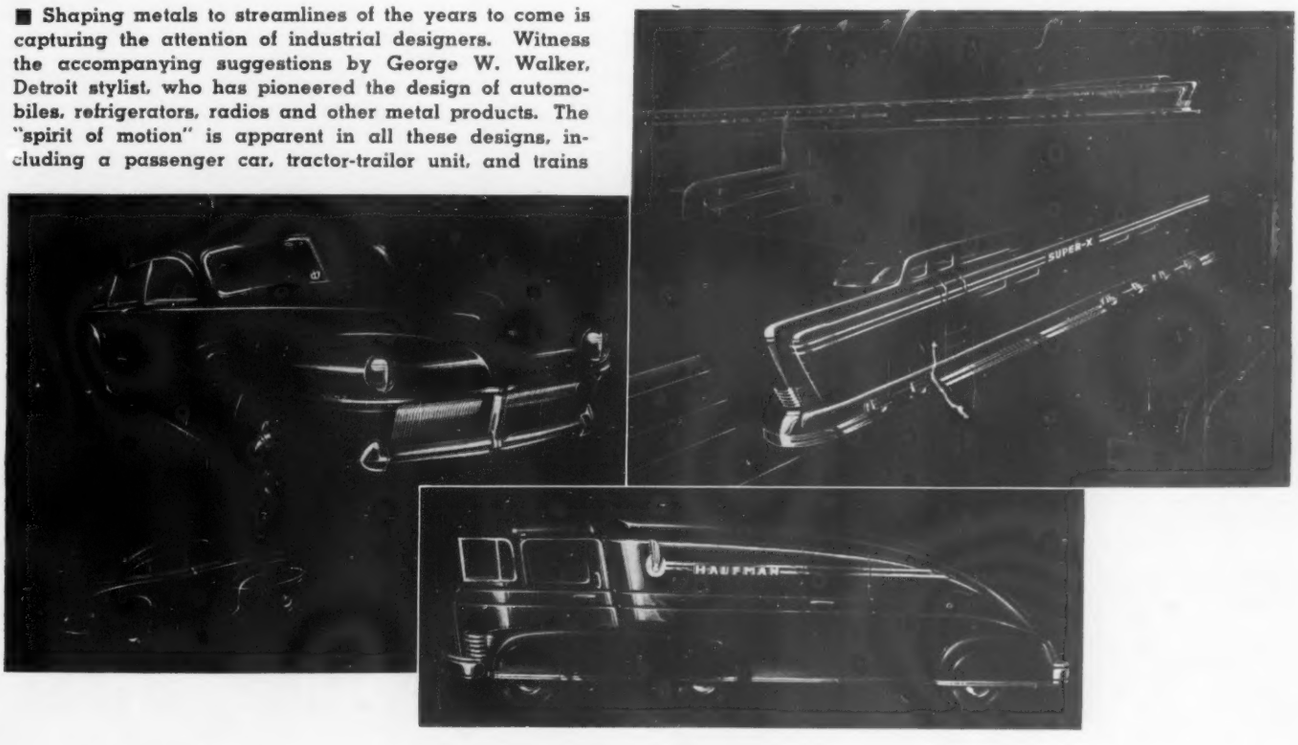
Lack of motor assemblies forced Plymouth to postpone final assemblies until last Monday, but they are pouring out new cars now at the rate of about 2000 per day, aiming at 2500 a day soon. Two 9-hour shifts worked in the effort to whittle down the large banks of orders in dealers hands all over the country. Last week releases went out for a lot of 50,000 cars.

Chrysler division got back into production immediately and about 575 units were turned out in the three days following the strike settlement, the plants working Saturday. Last week close to 1700 came off the lines at Chrysler. The entire corporation is now back at its former level of approximately 23,000 cars per week from all divisions.

Chrysler employes last week were permitted to borrow $10 each from the funds of the Chrysler industrial association, repayable in small amounts over succeeding months. Many thousands lined up for these loans, and estimates indicated close to $500,000 would be so dispersed.

Despite newspaper reports the UAW-CIO is now marshaling its forces for a drive on General Mo-

■ **Shaping metals to streamlines of the years to come is capturing the attention of industrial designers. Witness the accompanying suggestions by George W. Walker, Detroit stylist, who has pioneered the design of automobiles, refrigerators, radios and other metal products. The "spirit of motion" is apparent in all these designs, including a passenger car, tractor-trailor unit, and trains**



tors, seeking NLRB elections in the 60-odd plants of the corporation, it is believed around Detroit that any such drive will be slow in maturing, in view of the fact the UAW won so little from its disastrous strike in Chrysler plants. It is going to be doubly difficult to sell the union membership on any strike efforts right now when the futility of such drives has been demonstrated so clearly. Furthermore, the UAW-CIO will have to carry out a lot of organization work in the GM plants away from the Detroit district before it can be sure of even enough support to guarantee a tie-up of operations.

The complete decentralization of GM operations makes the company considerably more invulnerable than Chrysler.

■ FORMATION of the Detroit Council for Industrial Peace, mentioned here last week, undoubtedly was inspired by the Chrysler labor trouble, but it has no direct connection with the late unrest, in fact Chrysler is understood to have purposely refrained from lending any support to the organization lest the UAW use such a move as an illustration of so-called "strikebreaking." The DCIP was organized as the aftermath of a luncheon conference by four Detroiters—a manufacturer, a retail business man, a retail merchant and a stock broker.

Realizing something had to be done to arouse public opinion against industrial strife in Detroit, they conceived the plan for the council and spread the word among their friends. In a day or two details had been drawn up and 110 business organizations had pledged support, financially to the extent of $1 per employe.

Newspaper advertising, radio announcements, direct mail campaigns, lectures and other forms of contact with the public will be used over the next six months, in the effort to drum up popular support. If this fails, the organizers say they will give up and join the Canadian expeditionary forces, but they have good reason to believe their work will succeed.

A platform for industrial peace has been drawn up, which might well be a model for a national platform of this sort. Eleven points are listed, and they may be summarized as follows:

1. The American system of industry offers the best opportunity in the world for increasing prosperity and happiness of every individual.

2. Every man and woman and every employe and his family benefit from success and growth of industries and suffer when business does not prosper.

3. All citizens and workers, including management, have common interest in promoting production efficiency, thereby providing lower prices for consumers. Consequent increase of consumption in turn brings steadier employment at highest possible wages.

4. Industrial peace and prosperity can be effectively promoted by collective bargaining between informed, reasonable and fair-minded parties.

5. Each employe should have the right to decide for himself, without coercion from any source, whether he wishes to join or not join any particular labor organization. Workers who choose to join should be active members, participating in election of representatives and determination of all activities.

6. Every citizen who is able and willing to work should be fully protected by all law enforcing agencies in his right to work.

7. Management and workers have mutual interests which can be assured only by close personal relations and co-operation. Every executive, superintendent and foreman is obligated to give a square deal to every worker in his organization.

8. Every worker is obligated to deliver an honest day's work for his day's pay.

9. Strikes and industrial disputes seriously affect the success of industry and greatly lessen the well-being, prosperity and security of employes and that of the entire community.

10. Every effort, including bargaining, negotiation and mediation, should be made by all concerned, both employers and employes, to eliminate industrial strife and the consequent heavy losses and suffering.

11. We believe that alien propoganda which is aimed at destroying both the American system of industry and our present form of government is an inciting cause of much of present industrial confusion and strife. It should be understood and resisted by every good American citizen.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1937	1938	1939
Jan.	399,186	226,952	356,950
Feb.	383,900	202,597	317,517
March	519,022	238,447	389,489
April	553,231	237,929	354,263
May	540,377	210,174	313,214
June	521,153	189,402	324,235
July	456,909	150,450	218,478
Aug.	405,072	96,946	103,343
Sept.	175,630	89,623	192,672
Oct.	337,979	215,286	323,017
10 mos.	4,292,459	1,857,806	2,893,178
Nov.	376,629	390,405	.....
Dec.	347,349	406,960	.....
Year	5,016,437	2,655,171	.....

Estimated by *Ward's Reports*

Week ended:	1939	1938†
Nov. 11	86,200	86,094
Nov. 18	86,700	96,735
Nov. 25	72,520	84,730
Dec. 2	93,638	97,795
Dec. 9	113,298	100,705

†Comparable week.

	Week Ended Dec. 9	Dec. 2
General Motors	48,925	48,230
Chrysler	23,790	4,575
Ford	24,225	24,665
All others	16,358	16,168

Rolls-Royce Inc., British engine and automobile manufacturer, has established offices here for the ostensible purpose of lining up sources of supply for materials, parts, equipment and the like in event a sudden emergency should cripple the flow of such items into British plants which are devoting part of their output to government needs for war *materiel.* The local organization has been busy for almost two months in ascertaining what plants in this area are equipped and willing to supply needs for certain parts, then relaying the information to England. However, British headquarters so far have turned down all suggestions made here, so the local staff does not know what is coming next.

Expedite Machinery Exports

There is some connection between the Rolls-Royce office here and Machinery Suppliers Inc., located in the Graham-Paige plant, the latter set up to purchase equipment for Ford plants in France which are to build the Rolls-Royce Merlin aircraft engine, apparently under license from the British company. Just how the Rolls-Royce staff here functions with the French undertaking is not known definitely, but it is probably a matter of attempting to expedite purchases and shipments of American machinery to the French plants.

The Merlin engine, incidentally, described in British aircraft papers last spring, is a V-12 liquid-cooled job, with aluminum alloy crankcase and block and developing around 1200 horsepower.

Weird stories recently have been circulated around Detroit that Rolls-Royce was proposing to spend $2,500,000 on an aircraft engine plant here, perhaps taking over some Packard facilities for the purpose. These are all ridiculed by the local staff, but they admit a sudden change of events in Europe might change the picture radically here. The first step, however, would not involve building a plant, but rather the farming out of parts manufacture and perhaps some assemblies to American plants.

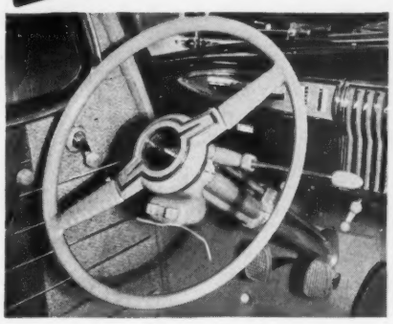
F.O.B. DETROIT

DO DIE CASTINGS INFLUENCE CAR SALES?

— A "Quiz"

F.O.B. DETROIT

Q Is the directional signal an important sales feature?



A Car buyers are always interested in safety features. The directional signal switch shown here (flashes a warning both fore and aft that a turn is to be made) is composed of five ZINC Alloy Die Castings. Three other cars have die castings performing similar duties.

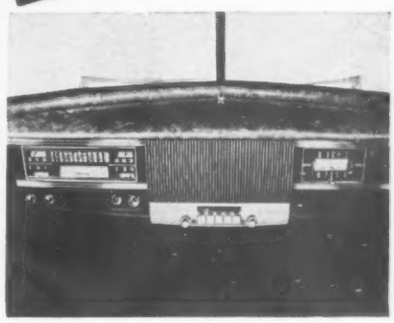
F.O.B. DETROIT

Q Is the public conscious of automotive "tailoring"?

A Automotive styling today is based on consumer demands—and ZINC Alloy Die Castings make many style trends possible. To make the headlamp bezel fit the fender, instead of vice versa, most 1940 fender lines require die cast bezels.

F.O.B. DETROIT

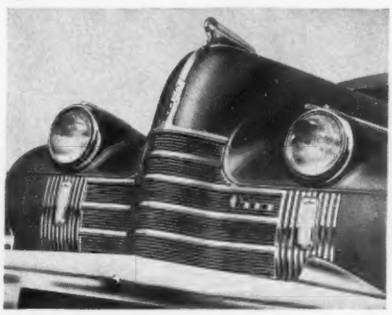
Q Do car dealers use the instrument panel as a sales point?



A When the dealer has a panel like the one shown above to point to, he is equipped with additional sales ammunition. This entire panel, with the exception of the instruments, clock and radio control, consists of four ZINC Alloy Die Castings.

F.O.B. DETROIT

Q How does the car buying public distinguish one make of car from another?



A The quickest way to differentiate between 1940 cars is to look at the front ends—at the radiator grilles. The car shown here employs a ZINC Alloy Die Cast grille for the sixth successive year. Only five makes of 1940 cars do not carry radiator grilles produced by this metal and method.

Appearance and selling price are two major factors in merchandising all products. ZINC Alloy Die Castings strongly influence both of these factors in a wide variety of items—from automobiles to floor lamps. If you are not thoroughly acquainted with the reasons why, we suggest that you consult a commercial die caster—or write to The New Jersey Zinc Company, 160 Front Street, New York City, New York.

ZINC ALLOY DIE CASTINGS

The Research was done, the Alloys were developed, and most Die Castings are made with

HORSE HEAD SPECIAL (99.99+% Uniform Quality) ZINC

October Imports Down 36 Per Cent

■ IRON and steel imports into the United States in October, excluding scrap, amounted to 16,884 gross tons valued at $1,147,656. This was a decline of 36 per cent from the 26,658 tons, valued at $1,431,318, in September, according to the department of commerce. In October, 1938, imports were 29,921 tons, valued at $1,300,714.

Shipments from warring countries were reduced sharply, France sending only 4 tons, compared with 1782 tons in September, Germany 129 tons in contract with 1103 tons, and the United Kingdom 63 tons against a September total of 86 tons. Trade with Belgium-Luxemburg and Norway also was curtailed, the former cut to 1032 tons from 5371, and the latter to 1779 tons from 3674. Imports from the Netherlands rose from 11 tons in September to 1402 tons in October, Swedish imports from 1918 tons to 2979 tons, and British Indian from 2700 to 4132 tons.

Raw materials made up about two-thirds of October imports, pig iron accounting for 5077 tons, including 4132 tons from British India and 945 tons from Canada; ferromanganese 3115 tons, 1713 from the Netherlands and 1402 tons from Norway; spiegeleisen 2364 tons, all from Canada.

Cumulative figures for 10 months total 257,848 tons valued at $15,259,810, a gain of 32.3 per cent in quantity and 25.2 per cent in value over 194,973 tons valued at $12,192,558 for the corresponding months of 1938.

Scrap imports were much lower in October than in September, 2305 tons valued at $32,182, against 3216 tons valued at $27,314. Canada with 1552 tons and Mexico with 508 tons were principal shippers. In ten months this year scrap imports totaled 27,388 tons valued at $281,223. In the same period last year the tonnage was 12,183, valued at $153,802.

■ Locomotive builders had unfilled orders for 160 railroad locomotives at the end of October, compared with 136 in September and 82 in October, 1938, as reported to the department of commerce. In October 47 units were shipped, compared with 35 in September and 10 in October, 1938.

U. S. FOREIGN TRADE IN IRON AND STEEL, INCLUDING SCRAP

Gross Tons

	1939		1938	
	Exports	Imports	Exports	Imports
Jan.	362,672	27,664	586,294	29,631
Feb.	359,690	19,149	460,640	19,589
March	474,360	25,369	526,883	11,827
April	394,008	44,083	489,202	21,237
May	532,641	28,142	540,639	20,814
June	588,856	32,587	312,021	15,887
July	513,664	30,851	263,699	14,728
Aug.	477,078	28,328	242,139	20,041
Sept.	575,613	29,874	346,068	27,958
Oct.	591,856	19,189	425,431	26,445
Nov.	.....	.....	469,596	27,627
Dec.	.....	.....	490,095	28,767
Total	.....	.....	5,152,707	264,551

ORIGIN OF OCTOBER IMPORTS

Gross Tons

	Iron ore	Pig iron	Manganese ore	Ferromanganese
Norway	32,299	.....	.....	1,713
Sweden	46,605	.....	.....	.....
United Kingdom	10	.....	.....	.....
Canada	6,495	945	.....	.....
Mexico	179	.....	.....	.....
Cuba	22,000	.....	5,285	.....
Chile	88,400	.....	.....	.....
Newfoundland	7,450	.....	.....	.....
British India	.....	4,132	10,532	.....
Soviet Russia	.....	.....	17,792	.....
Gold Coast	.....	.....	23,606	.....
Netherlands	.....	.....	.....	1,402
Total	203,438	5,077	57,215	3,115

	Sheets, skelp and sawplate	Structural steel	Steel bars	Hoops and bands
Canada	2	.....	.....	27
Sweden	6	.....	400	1
Belgium	.....	420	310	133
United Kingdom	.....	.....	1	.....
France	.....	.....	.....	4
Japan	.....	.....	.....	20
Total	8	420	711	185

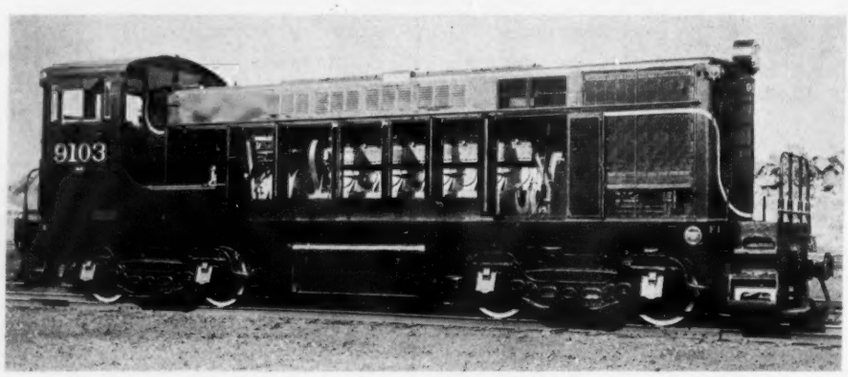
UNITED STATES IMPORTS FOR CONSUMPTION OF IRON AND STEEL PRODUCTS

Gross Tons

Articles	Oct. 1939	Sept. 1939	Jan. thru Oct. 1939
Pig iron	5,077	4,176	34,500
Sponge iron	256	53	1,531
Ferromanganese (1)	3,115	3,702	29,665
Spiegeleisen	2,364	8,349	29,562
Ferrochrome (2)	.....	18	129
Ferrosilicon (3)	289	142	1,398
Other ferroalloys (4)	66	12	278
Steel ingots, blooms, etc.	1	.....	12
Billets, solid or hollow.	166	14	434
Concrete reinforc. bars.	....	20	2,350
Hollow bar and drill steel	107	107	1,185
Bars, solid or hollow	711	1,241	15,975
Iron slabs	.....	.....	.....
Iron bars	82	143	660
Wire rods	1,152	1,052	8,717
Boiler and other plate (including skelp)	1	2	24
Sheets, skelp, saw plate	8	80	1,386
Die blocks or blanks, etc.	2	.....	82
Tin plate, taggers' tin and terneplate	14	9	65
Structural shapes	420	1,936	37,868
Sashes and frames	.....	.....	5
Sheet piling	.....	.....	462
Rails and track material	1,484	85	6,289
Cast-iron pipe, fittings	...	782	1,478
Mall. iron pipe fittings.	29	3	144
Welded pipe	82	117	4,462
Other pipe	383	220	25,421
Cotton ties	.....	804	7,126
Other hoops and bands	185	1,276	15,917
Barbed wire	100	1,159	14,750
Round iron and steel wire	286	185	2,075
Teleg and telephone wire	.....	.....	7
Flat wire and steel strips	273	202	2,592
Wire rope and strand	54	74	1,437
Other wire	18	109	1,428
Nails, tacks, and staples	73	549	6,977
Bolts, nuts, and rivets	10	7	96
Horse and mule shoes	.....	17	324
Castings and forgings	76	13	1,037
Total	16,884	26,658	257,848
Iron and steel scrap	2,305	3,216	27,388
GRAND TOTAL	19,189	29,874	285,236

(1) Manganese content; (2) chrome content; (3) silicon content; (4) alloy content.

Building Switching Locomotives by Line Production



■ Baldwin Locomotive Works, Eddystone, Pa., will build diesel-electric switching locomotives by line production methods. Initial investment of more than $2,000,000 is being made for facilities and material for the first group of 28 units, including 1000 and 660-horsepower motors. These will be placed in stock for purchasers to select from, much as automobiles are sold. This will afford opportunity for transportation officials to see the locomotives demonstrated in actual operation.

Company announcement states: "Certain types of railroad motive power can now be chosen from stock, as automobiles are selected in a showroom. The schedule calls for completion of the 28 engines for switching and transfer service, regardless of whether orders are received beforehand."

The 1000 - horsepower engines weigh 124 tons and the 660-horsepower 100 tons. Two are now on display, powered with De La Vergne diesels manufactured by a Baldwin subsidiary. They have exceptionally good visibility, an important safety feature in yard service, safety tread on steps and easy mechanical accessibility.

Scrap Survey Shows 7,220,000 Tons In Consumers', Suppliers' Hands

■ DOMESTIC stocks of steel and iron scrap at consumers' and dealers' plants and in transit at the end of September, 1939, exceeded 7,220,000 gross tons, according to a preliminary survey by the bureau of mines, department of the interior.

At the request of the army and navy munitions board the bureau will make a second survey at the close of the year and it is expected a larger number of dealers and automobile wrecking companies will participate, making available complete data. The second survey will include a selected list of industrial plants that produce scrap for sale.

The report is based on returns from 595 consumers, representing 86 per cent of total scrap used in 1938; from 1705 of 3530 scrap dealers canvassed; from 1165 of 3306 automobile wrecking establishments canvassed, and from 67 large railroad companies.

Supply for Ten Weeks

The 7,220,000 tons accounted for included 5,405,000 tons of purchased or merchant scrap and 1,815,000 tons of home scrap held at consumers' plants. Returns from the consumers representing 86 per cent of 1938 consumption totaled 4,092,488 tons from which total consumer stocks are estimated at 4,760,000 tons. No estimate could be made of stocks at suppliers' yards, owing to incomplete returns. Scrap consumption in September totaled 3,078,100 tons, indicating known stocks were equivalent to ten weeks' supply.

The bureau suggests that in appraising the figures it should be borne in mind the survey did not include stocks held by firms that produce and sell scrap incidental to manufacturing operations. Except for these, however, the investigation reached all branches of the trade engaged in reclamation and use of scrap.

Totals, likewise, do not include estimates of scrap available in many dumps, abandoned plants and equipment, which constitute the reservoir from which the scrap collector obtains much of his material. This potential supply rises and falls with changes in price levels, but the quantity available at a given time probably is not possible of statistical determination.

Proportion of pig iron to total scrap used in September by open-hearth and cupola furnaces, as compared with the year 1938, shows material changes. Open-hearth furnaces which in 1938 used proportions of 28.1 per cent of home scrap, 23.4 per cent purchased scrap and 48.5 per cent pig iron, in September showed proportions of 28.4, 20.4 and 51.2 per cent, respectively. Cupola furnaces, which in 1938 used proportions of 26.4 per cent home scrap, 37.1 per cent purchased scrap and 36.5 per cent pig iron, in September showed 27.5, 38.2 and 34.3 per cent, respectively.

The bureau sent questionnaires to 7713 companies, including a selected list of 339 dealers representing most of the larger units, 3594 other dealers, 3713 automobile wrecking establishments, and 67 railroads which carried over 90 per cent of revenue freight in 1938. Replies were received from 1705 dealers, including almost complete returns from the larger units; 1165 automobile wreckers and 67 railroad companies.

The accompanying tables present comparisons of consumers' and suppliers' stocks, segregated by grades and sources, and also comparisons of consumption by various types of furnaces. In the latter table the figure for purchased scrap in September represents reported tonnage corrected on basis of coverage compared to 1938 figures and for home scrap in proportion as indicated by September canvass. The latter indicated coverage of 98 per cent of open-hearth furnaces, 99 per cent of bessemer, 85 per cent of electric, 53 per cent of cupola, 81 per cent of air, 99 per cent of blast, and 40 per cent of direct castings, as compared to 1938 returns.

Consumers' and Suppliers' Stocks of Scrap

Gross Tons, as of Sept. 30, 1939

Purchased or prepared:	Consumers' stocks* At plants	In transit	Total	Suppliers' stocks† Scrap dealers	Auto wreckers	Railroads	Total
No. 1 heavy melting steel	880,309	130,413	1,010,722	420,029	8,709	76,184	504,922
No. 2 heavy melting steel	336,000	49,595	385,595	299,627	27,488	2,293	329,408
Bundles	139,272	25,431	164,703	92,529	1,470	135	94,134
Cupola grades	303,220	24,415	327,635	226,392	3,148	20,876	250,416
All other	571,188	72,553	643,741	388,432	21,849	183,809	594,090
Total	2,229,989	302,407	2,532,396	1,427,009	62,664	283,297	1,772,970
Home scrap:							
Open-hearth grades	1,318,098	815	1,318,913	.....	.....	.....	.....
All other	233,304	7,875	241,179	.....	.....	.....	.....
Total	1,551,402	8,690	1,560,092	.....	.....	.....	.....
Partially or unprepared	.....	.....	.....	333,919	76,411	170,278	580,608
In transit or export	.....	.....	.....	89,585	4,558	13,154	107,297
Total scrap	3,781,391	311,097	4,092,488	1,850,513	143,633	466,729	2,460,875
Pig iron	3,068,014	91,071	3,159,085	.....	.....	.....	.....

*Reported by consumers using 86 per cent of total in 1938. †Incomplete returns.

Estimated Scrap, Pig Iron Consumption by Types of Furnaces

Type of furnace:	September 1939 Gross Tons Home	Purchased	Total	Pig iron	Per cent Home	Purchased	Total	Pig iron	Per cent consumed in 1938 Home	Purchased	Total	Pig iron
Open hearth	1,221,000	877,000	2,098,000	2,201,000	28.4	20.4	48.8	51.2	28.1	23.4	51.5	48.5
Bessemer	16,000	1,500	17,500	410,000	3.8	.3	4.1	95.9	5.4	.2	5.6	94.4
Electric	68,000	71,000	139,000	2,000	48.3	50.3	98.6	1.4	47.6	50.7	98.3	1.7
Cupola	220,000	305,000	525,000	274,000	27.5	38.2	65.7	34.3	26.4	37.1	63.5	36.5
Air	37,600	24,000	61,600	26,100	42.9	27.3	70.2	29.8	48.2	21.4	69.6	30.4
Blast	153,000	84,000	237,000	.....	64.6	35.4	100.0	....	71.8	28.2	100.0	....
Direct castings	.....	.....	.....	133,000	....	....	....	....	....	....	....	....

Editorial

May We Never Use This Blueprint!

■ WITH our country unique as a land of peace in a world at war, it is natural for businessmen to ponder the question, "What if the United States should become involved."

As far as industry is concerned, there is no need to rely upon the imagination as what conditions would prevail. Unlike the situation in 1917, the "blueprint"—even though it be more or less a preliminary design—already has been made. It is entitled "Industrial Mobilization Plan Revision of 1939." It is available as Document No. 134 from the Superintendent of Documents, Washington, for 10 cents.

This plan, as approved jointly by Louis Johnson, acting secretary of war, and Charles Edison, acting secretary of the navy, is no flash in the pan touched off by present world conditions. The first published text was submitted by the war department to the war policies commission in 1931. Since then it has been revised three times, in 1933, 1936 and 1939.

Constitutional Processes Not To Be Modified by Preparedness Plan

"It is a study," according to its foreword, "a guide to be available in time of war. It would apply only for the duration of such a war. It attempts to anticipate the difficulties experienced by the United States during the war of 1914-1918. It aims to overcome such difficulties promptly and effectively in any future war.

"The plan does not propose to modify any of our constitutional processes. Indeed, the prime purpose of procurement planning and of the industrial mobilization plan is the preservation of these processes for the people of the United States."

As is true of any good working drawing there is nothing glamorous about this plan, nor does it leave essentials to chance or to the imagination. It is obvious that martial music, brass buttons and flag waving are out as far as the citizenry is concerned. It also is clear that war will not be made a quick road to riches for corporations or individuals.

War Would Bring To Bear Every Material Resource of Nation

"War," it sets forth, "is no longer simply a battle between armed forces in the field—it is a struggle in which each side strives to bring to bear against the enemy the co-ordinated power of every individual and every material resource at its command. The conflict extends from the soldier in the front line to the citizen in the remotest hamlet in the rear."

To meet such an eventuality, the United States under this carefully devised plan will almost overnight become one of the most highly regimented nations in the world, a temporary autocracy organized for the preservation of democracy. Let us hope that by keeping our heads we can avoid necessity for putting this plan into action.

The BUSINESS TREND

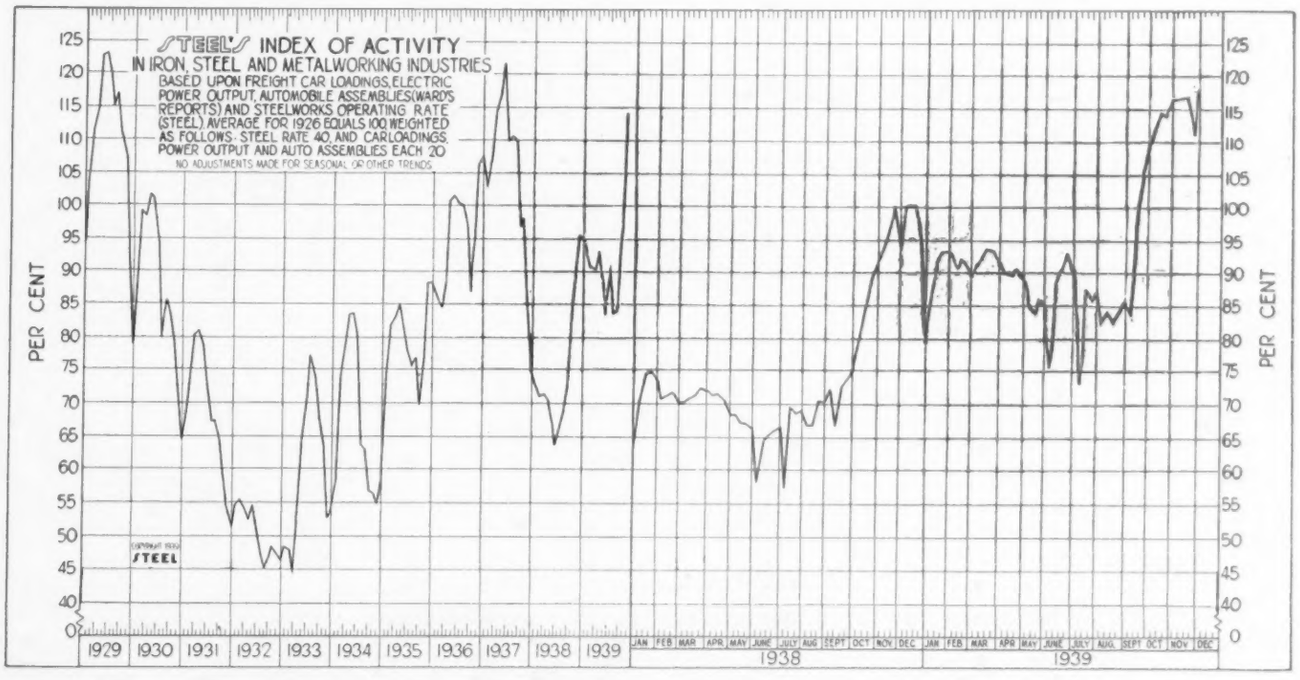
Index of Activity Reaches Highest Level of Year

■ FOLLOWING the sharp upturn in industrial activity throughout September and October a general leveling off process occurred last month at the highest levels since 1937. In some industries operations approached the 1929 peak. Reflecting this condition STEEL's index average for the month gained 2.2 points to 116.2. In contrast with this showing, the index recorded an increase of 14.1 points during September to reach 98, and advanced still further during October to 114. In November last year the index average was 95.9. It is necessary to go back to May, 1937, to find a month in which the index average exceeded that recorded in November.

While the volume of new business placed during November did not maintain the pace recorded in the preceding two months, the large order backlogs accumulated during September and October plus the steady inflow of additional business is expected to sustain the current high level of industrial activity at least through the remainder of this year.

Despite the influence of the observance of Thanksgiving day in some states during the week ended Dec. 2, industrial activity recorded an encouraging rebound from the slight dip registered in the previous week. All four business indicators composing STEEL's index advanced during the latest period, forcing the index to the highest level of the year to-date. The index figure of 117.9 for the week ended Dec. 2, compares with 111.4 in the previous week and 100.1 in the corresponding week of last year.

Steelmaking operations gained one-half point to 94


STEEL'S INDEX OF ACTIVITY
IN IRON, STEEL AND METALWORKING INDUSTRIES
BASED UPON FREIGHT CAR LOADINGS, ELECTRIC POWER OUTPUT, AUTOMOBILE ASSEMBLIES (WARD'S REPORTS) AND STEELWORKS OPERATING RATE (STEEL) AVERAGE FOR 1926 EQUALS 100 WEIGHTED AS FOLLOWS: STEEL RATE 40, AND CARLOADINGS, POWER OUTPUT AND AUTO ASSEMBLIES EACH 20
NO ADJUSTMENTS MADE FOR SEASONAL OR OTHER TRENDS
PER CENT
1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939
1938
1939

STEEL'S index of activity advanced 6.5 points to 117.9 in the week ended Dec. 2:

Week ending	1939	1938
Sept. 16	97.5	72.9
Sept. 23	103.0	74.0
Sept. 30	107.9	74.9
Oct. 7	112.5	78.9
Oct. 14	113.9	84.3
Oct. 21	113.6	88.7
Oct. 28	116.2	91.4
Nov. 4	117.1	93.4
Nov. 11	117.2	95.9
Nov. 18	117.3	100.4
Nov. 25	111.4	93.9
Dec. 2	117.9	100.1

Mo. Data	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
Jan.	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6	104.1
Feb.	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2	111.2
March	92.6	71.2	114.4	88.7	83.1	78.9	44.5	54.2	80.4	98.6	114.0
April	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7	122.5
May	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2	122.9
June	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8	120.3
July	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9	115.2
Aug.	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4	116.9
Sept.	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	83.7	110.8
Oct.	114.0	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8	107.1
Nov.	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	71.0	92.2
Dec.	....	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	64.3	78.3

per cent during the week ended Dec. 2, to reach the highest level since the week ended Aug. 10, 1929. With the exception of minor fluctuations resulting from necessary furnace repairs, the national steel rate should maintain the current level through the remainder of the year.

Sharp gain in automobile production during the week ended Dec. 2, to 93,638 units, reflected in part the resumption of operation at Chrysler plants during the latter part of the week. Last week assemblies exceeded the 100,000 mark to reach a new peak for the year to-date.

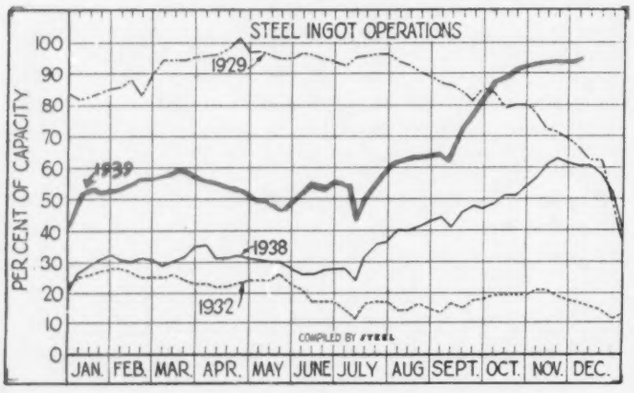
With the capital goods industries as active as is now indicated for the first quarter it would appear doubtful that a major business recession will develop. In some instances, as in the machine tool and railroad equipment industries, deliveries are extended well into the first half of next year. Irrespective of the inventory position, business in the first quarter will have the support of a high level of operations in the capital goods industries.

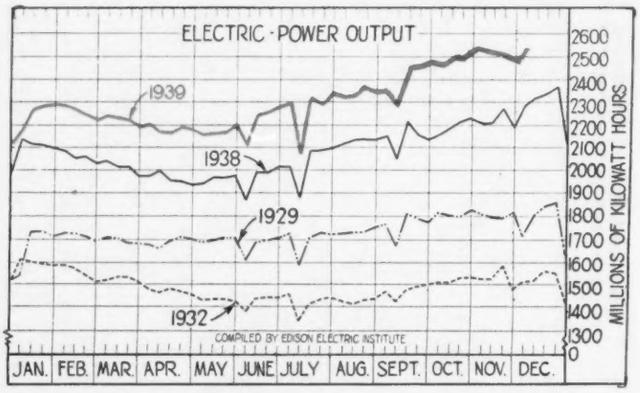
NOVEMBER PIG IRON OUTPUT UP SHARPLY

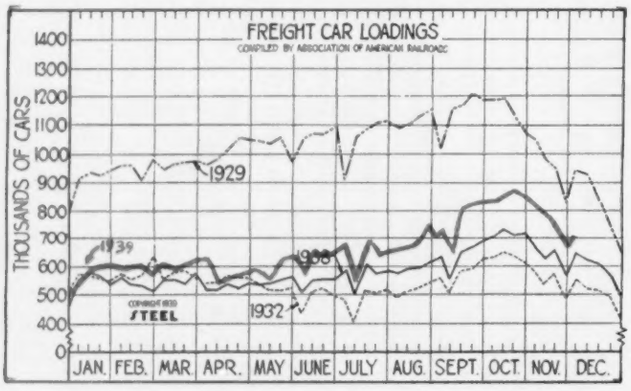
Daily average pig iron output during November reached an all-time high for that month. Daily production of 124,200 gross tons represented an increase of 6.1 per cent over the September daily average output of 117,012 tons, and was the largest since May, 1929. In November, 1938, daily average production was 76,222 tons. Total production last month amounted to 3,726,021 tons, a gain of 2.7 per cent over the October output of 3,627,384. Production during November was the largest since August, 1929, and compares with 2,286,661 tons produced in November, 1938. Operations last month were at the rate of 90.5 per cent of capacity, against 85.2 in October, 69.7 in September and 62.4 in August. The November, 1938, rate was 55 per cent.

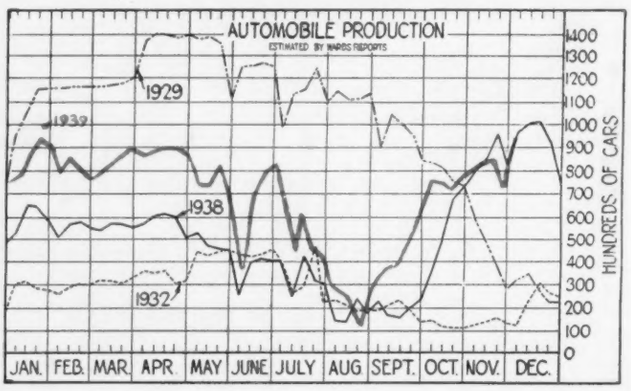
NET RAILROAD OPERATING INCOME UP 17.6%

Class I railroads' net operating income during October recorded a sharp increase of 17.6 per cent, according to the Association of American Railroads. October net operating income reported by these roads totaled $101,616,477, or 2.94 per cent on investment. In the preceding month net operating income amounted to $86,435,178, equal to 2.9 per cent return on invested property, while in October, 1938, net operating income was $68,594,809, or 1.98 per cent return on investment.

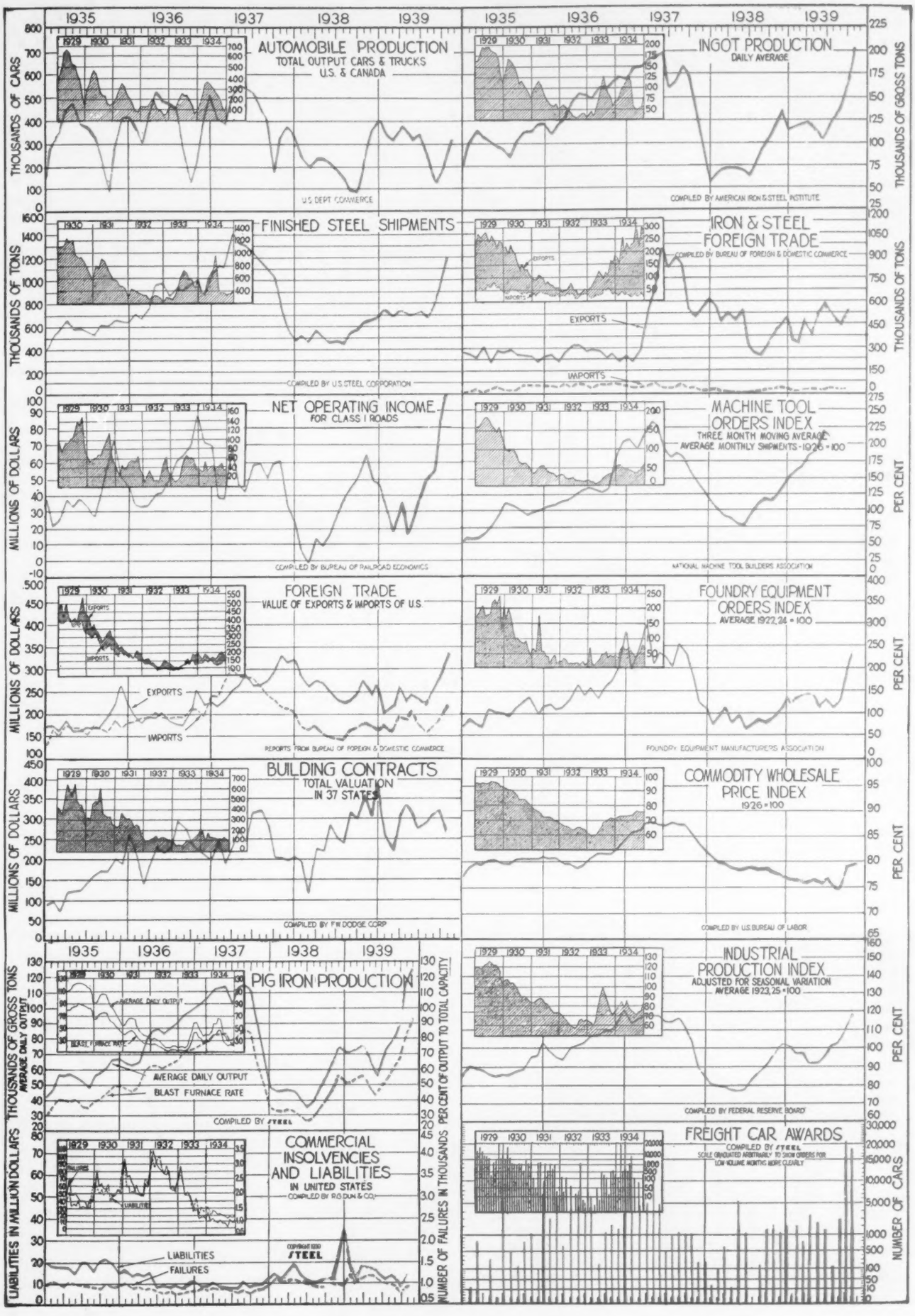








Week ending	Steelworks Operating Rate Per Cent 1939	1938	1932	1929	Electric Power Output Million KWH 1939	1938	1932	Freight Car Loadings Thousands of Cars 1929	1939	1938	1932	1929	Weekly Auto Output 1939	1938	1932	1929
Aug. 12	62.0	40.0	14.5	93.0	2,333	2,134	1,415	1,733	661	589	512	1,100	24,875	13,790	21,162	111,939
Aug. 19	63.5	41.5	15.5	90.0	2,368	2,139	1,431	1,750	674	598	518	1,136	12,955	23,940	19,568	111,902
Aug. 26	63.5	43.5	14.5	89.0	2,355	2,134	1,436	1,762	689	621	538	1,160	18,365	18,700	19,896	113,316
Sept. 2	64.0	44.5	13.5	87.5	2,357	2,149	1,464	1,675	722	648	561	1,017	25,240	22,165	19,561	90,913
Sept. 9	62.0	41.5	15.5	86.0	2,290	2,048	1,423	1,806	667	569	501	1,153	26,865	17,485	21,586	104,351
Sept. 16	74.0	46.0	15.0	84.5	2,444	2,215	1,476	1,792	806	660	587	1,166	41,245	16,100	23,116	100,042
Sept. 23	79.5	48.0	17.0	82.0	2,449	2,154	1,490	1,778	815	676	596	1,202	53,950	20,390	19,327	95,453
Sept. 30	84.0	47.0	18.0	85.0	2,470	2,139	1,499	1,819	835	698	622	1,179	62,755	25,405	13,265	83,201
Oct. 7	87.5	48.5	19.0	84.0	2,465	2,154	1,506	1,806	835†	703	625	1,179	76,095	37,665	14,568	82,088
Oct. 14	89.5	51.5	19.5	79.0	2,495	2,183	1,507	1,799	845	727	650	1,186	75,860	50,540	12,675	81,882
Oct. 21	91.0	51.5	19.5	80.0	2,494	2,214	1,528	1,824	861	706	642	1,134	70,114	59,860	11,165	76,870
Oct. 28	92.0	54.5	19.5	80.0	2,539	2,226	1,533	1,816	834	709	617	1,072	78,210	65,335	11,117	73,048
Nov. 4	93.0	57.5	21.0	77.5	2,537	2,207	1,525	1,798	805	673	587	1,050	82,690	80,030	12,257	61,824
Nov. 11	93.0	61.5	21.0	73.0	2,514	2,209	1,521	1,794	786	637	537	983	86,200	86,094	13,685	49,160
Nov. 18	93.5	63.0	19.0	71.0	2,514	2,270	1,582	1,818	771	657	576	950	86,700	96,735	16,497	38,219
Nov. 25	93.5	62.0	17.5	69.0	2,482	2,184	1,475	1,718	677	562	494	837	72,520	84,930	13,389	28,079
Dec. 2	94.0	61.0	16.0	67.0	2,539	2,286	1,510	1,806	689	649	547	937	93,638	97,795	12,398	31,255


1935 1936 1937 1938 1939
AUTOMOBILE PRODUCTION
TOTAL OUTPUT CARS & TRUCKS U.S. & CANADA
THOUSANDS OF CARS
U.S. DEPT. COMMERCE
INGOT PRODUCTION
DAILY AVERAGE
THOUSANDS OF GROSS TONS
COMPILED BY AMERICAN IRON & STEEL INSTITUTE
FINISHED STEEL SHIPMENTS
THOUSANDS OF TONS
COMPILED BY U.S. STEEL CORPORATION
IRON & STEEL FOREIGN TRADE
COMPILED BY BUREAU OF FOREIGN & DOMESTIC COMMERCE
EXPORTS
IMPORTS
THOUSANDS OF TONS
NET OPERATING INCOME
FOR CLASS I ROADS
MILLIONS OF DOLLARS
COMPILED BY BUREAU OF RAILROAD ECONOMICS
MACHINE TOOL ORDERS INDEX
THREE MONTH MOVING AVERAGE
AVERAGE MONTHLY SHIPMENTS - 1926 = 100
PER CENT
NATIONAL MACHINE TOOL BUILDERS ASSOCIATION
FOREIGN TRADE
VALUE OF EXPORTS & IMPORTS OF U.S.
EXPORTS
IMPORTS
MILLIONS OF DOLLARS
REPORTS FROM BUREAU OF FOREIGN & DOMESTIC COMMERCE
FOUNDRY EQUIPMENT ORDERS INDEX
AVERAGE 1922-24 = 100
PER CENT
FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION
BUILDING CONTRACTS
TOTAL VALUATION IN 37 STATES
MILLIONS OF DOLLARS
COMPILED BY F.W. DODGE CORP.
COMMODITY WHOLESALE PRICE INDEX
1926 = 100
PER CENT
COMPILED BY U.S. BUREAU OF LABOR
1935 1936 1937 1938 1939
PIG IRON PRODUCTION
AVERAGE DAILY OUTPUT
BLAST FURNACE RATE
THOUSANDS OF GROSS TONS AVERAGE DAILY OUTPUT
PER CENT OF OUTPUT TO TOTAL CAPACITY
COMPILED BY STEEL
INDUSTRIAL PRODUCTION INDEX
ADJUSTED FOR SEASONAL VARIATION
AVERAGE 1923-25 = 100
PER CENT
COMPILED BY FEDERAL RESERVE BOARD
COMMERCIAL INSOLVENCIES AND LIABILITIES
IN UNITED STATES
COMPILED BY R.G. DUN & CO.
LIABILITIES
FAILURES
LIABILITIES IN MILLION DOLLARS
NUMBER OF FAILURES IN THOUSANDS
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Idle Time Is Out IN MODERN MACHINE TOOLS

By GUY HUBBARD
Machine Tool Editor

■ BECAUSE OF the extraordinary characteristics of modern cutting materials—including the improved high speed steels as well as the cemented carbides—tremendous emphasis has of late years been placed on increased speeds and feeds possible on modern machine tools. Sensational though they are, increased speeds and feeds by no means are all there is behind the greatly improved efficiency of the latest machines. Engineers have done things to them which give them ability far to out perform the older machines irrespective of improvements in cutting materials.

Time is money in the machine shop and one of the most effective ways to save money in the shop is to avoid wasting time. Old fashioned machines in many instances were flagrant time wasters—not simply because they were slow, but because they were inefficient in their use of time. There were considerable periods in their cycles of operation which were characterized as "non-productive" and also as "idle time."

Some of the most outstanding achievements of machine tool engineers in recent years have been in the direction of getting rid of this "idle time" by eliminating from their machines the mechanical causes of it. In this work they have had the valuable co-operation of production engineers whose time studies have in many cases brought to light the deficiencies of machine tools as utilizers of time.

Idle time probably did not come in for much critical attention until co-ordinated mass production became common practice. First, it was discovered that certain machines were responsible for retarding the flow of work. Then, with attention thus concentrated on certain machines, it was discovered that certain portions of the cycle of these machines were responsible for their undue slowness.

For instance, if shifting of speeds and feeds was slow and difficult, these machines would be allowed to run on certain cuts at inefficient speeds and feeds. That is one very important reason why quick change gear boxes and geared heads were developed. Their ability instantly to give the correct feed and feed for every operation has done away with an appalling amount of misused time.

When the so-called station-type machines — including multiple spindle-automatic screw machines—first became common about 40 years ago, the primary idea was to make more efficient use of tools by causing all the tools to operate practically all the time instead of one at a time. Not much attention was paid to speed of indexing, stock feeding, return of tool slides, etc.

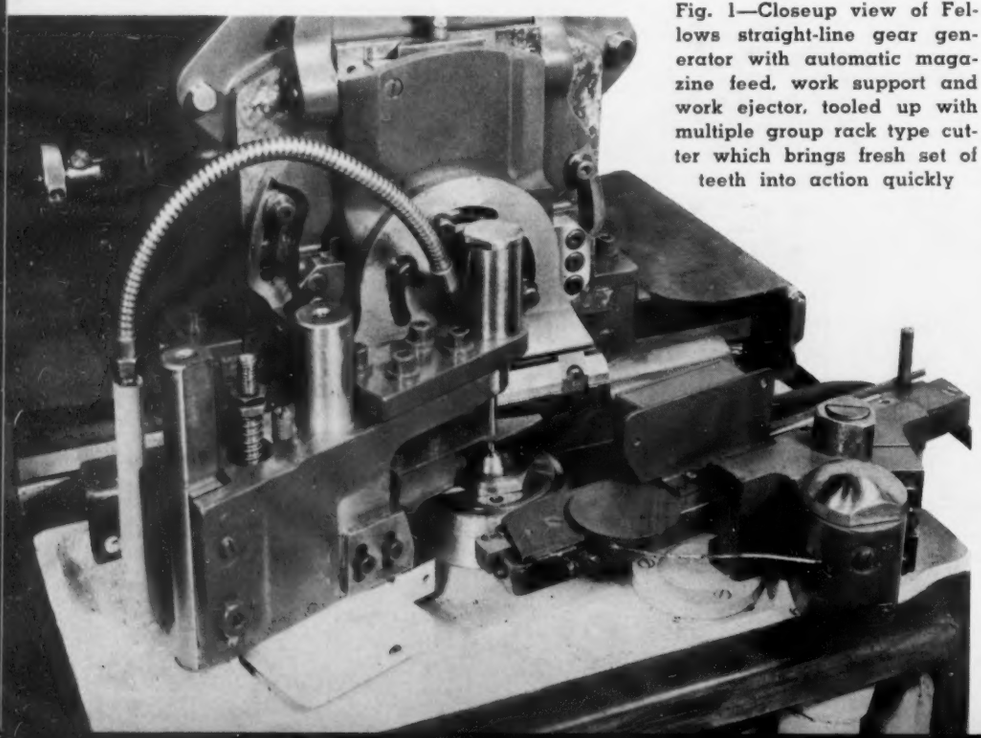

Fig. 1—Closeup view of Fellows straight-line gear generator with automatic magazine feed, work support and work ejector, tooled up with multiple group rack type cutter which brings fresh set of teeth into action quickly

Making Machines Fit Formula

The first thing discovered was that "the time per piece in these machines is approximately the time of the longest single operation." This led to concentration on methods for shortening the time of the longest operations. For instance, deep drilling and cutting off operations were divided among two or more positions. When tooling had been perfected along these lines, the word "approximately" in the above mentioned formula was of decided importance.

For example, when actual cutting time had been reduced to a few seconds and it took longer than that to draw back the tools, to index and to feed the stock, the idle time was liable to exceed considerably the productive time, so that the formula did not mean much.

It was then that engineers began to concentrate on quick acting indexing devices employing modified Geneva mechanisms, automatic gear shifts which threw the tool feedworks into "high" during the retractive movements; and various other refinements such as provision for

feeding out the stock "on the fly" in that momentary period while the spindle head is indexing. Refinements such as these actually have brought about "split second per piece" production on small work—not only on multiple spindle machines but also on those of modern single spindle type.

It is not necessary to turn to the station-type machines, however, to find good examples of idle time elimination. In planers, for instance, progress has been fully as marked. It is a characteristic of the planer (except in a few cases where reversible tools are used) that there is a non-productive back stroke. On old planers, with their screaming belts, this reversal was painfully obvious as well as slow.

In the modern planers reversal not only has been made quiet, but it is practically instantaneous. Also the back stroke is made at remarkably high speed considering the weight and inertia involved. In addition to this, the use of multiple heads—four in many cases—has multiplied the efficiency of the cutting stroke on many classes of work. It is worthy of note that it was in the shaper, a machine closely related to the planer, that the importance of an accelerated back stroke was first given consideration.

Speeding Work by Jumping Gaps

Another class of tools wherein quick return mechanisms have been developed to a high degree are milling machines. Not only that, but a fruitful cause of lost time commonly known as "cutting wind" has been done away with on the forward or cutting travel of their tables. Regardless of whether feed is by mechanical, electrical or hydraulic means, methods have been perfected whereby the gaps in the work between cuts can be "jumped" quickly by momentarily throwing the table feed into "high" through the action of adjustable control dogs.

Pages of intensely interesting pictures might be shown to emphasize how designers of practically every type of production machine tool have "tackled and licked" the problem of idle time.

As it is, three illustrations are presented herewith to give at least some idea of what can be done to make a machine tool effective most of the time rather than only part of the time.

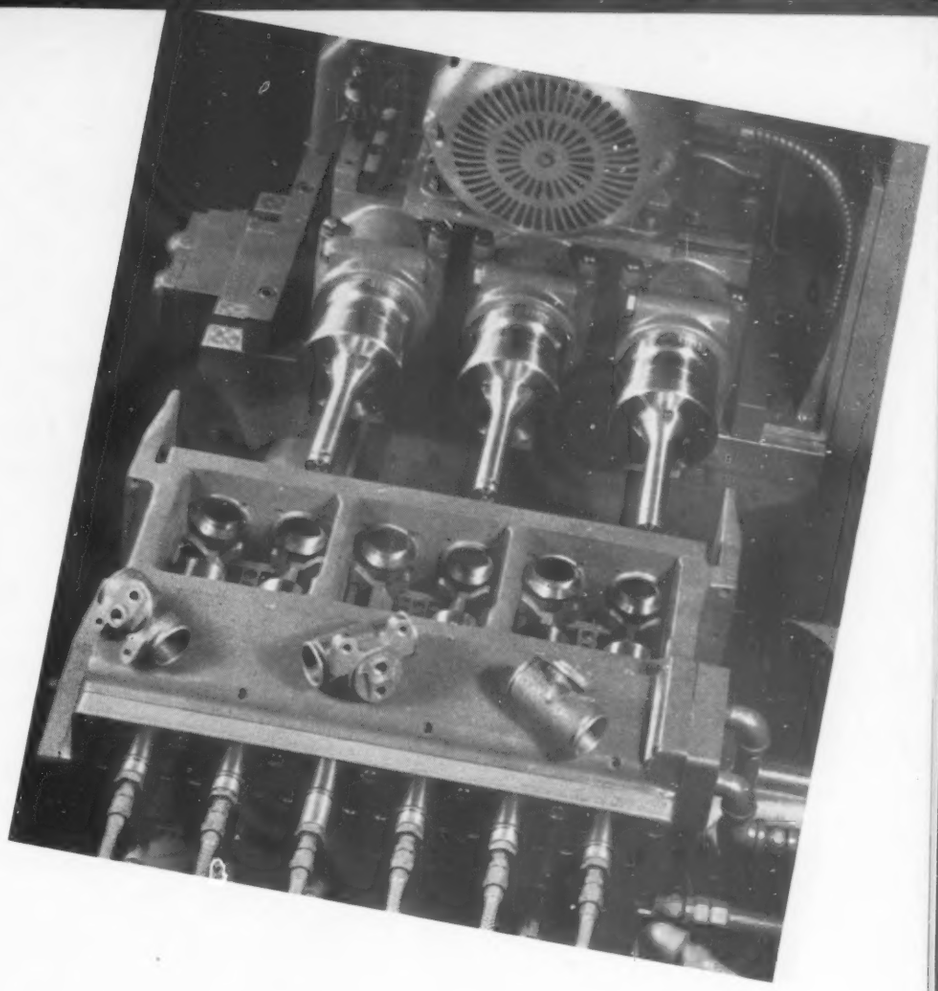

Fig. 1 is a closeup view of the new straight-line Fellows gear generator as demonstrated during the recent co-operative showings staged by the Springfield and Windsor, Vt., machine tool builders. This machine, designed for cutting small internal spur and helical gears of fine pitch, saves time by a quick acting automatic loading and unloading device of magazine type.

Furthermore, its rack-type cutter —which reciprocates up to 2000 strokes per minute—cuts on both its forward and backward transverse traverse. In addition to this, when cutting small pinions there are several groups of teeth, separated by gaps, on each rack-type cutter. When one set becomes dull, the bed is

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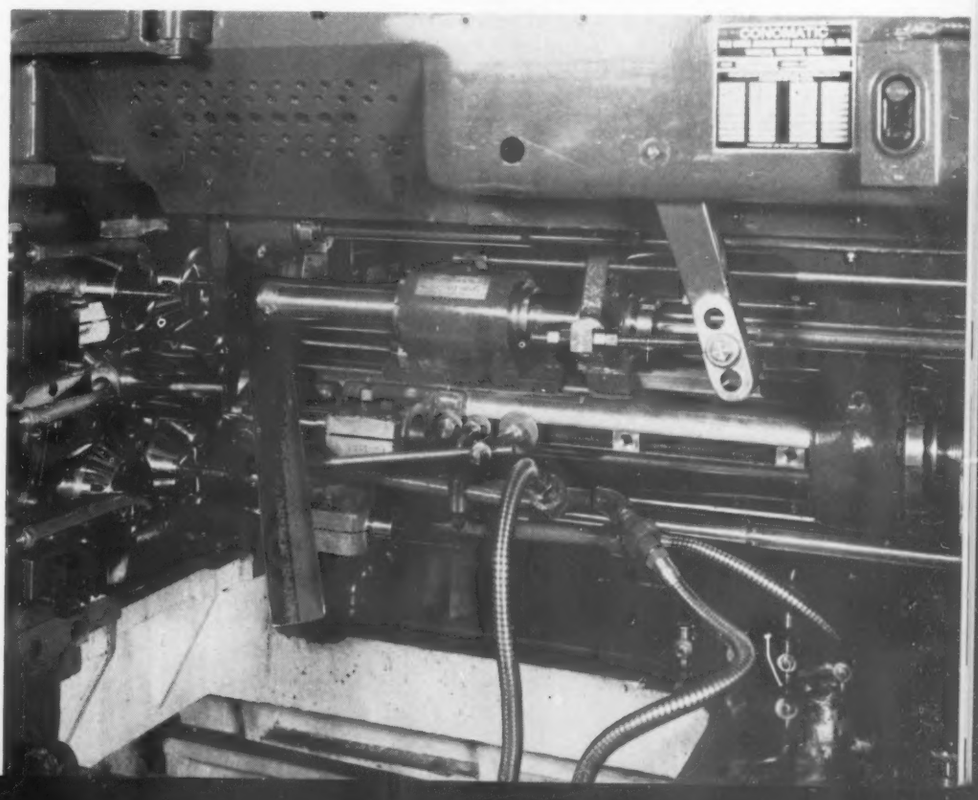

Fig. 2. (Upper right)—Ex-Cell-O multiple-spindle precision boring machine with "shifting" work holding fixture allowing three pieces to be loaded while three others are being bored

Fig. 3 (Lower right)—Six-spindle Conomatic screw machine of 1¼-inch bar capacity, showing how all tools are made to work practically all the time and how in the interests of efficiency reamer can be made to travel faster and further than main tool slide on which it is mounted

Making Meter Shafts

Severe service imposed on these parts make necessary high quality material and careful work. Small size makes cooling rate in quenching a critical factor. Mirror-like finish is obtained by tumbling

By ULRICH JELINEK
Meter and Instrument Engineering Department
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Newark, N. J.

■ LENGTH of life and accuracy of the modern electrical instrument are affected more by the quality and treatment of the steel used in their pivots and shafts than by any other factor in their mechanical construction.

The steel selected for this service is essentially of the fine-grained, high-carbon type tested for chemical analysis, physical soundness and grain size. Because of the small size of the parts made and the comparatively large heat loss in quenching during heat treatment, the steel must withstand heating to 100 degrees Fahr. above normal quenching temperature without an accompanying increase in grain size. The main criteria of quality of this steel are considered to be its ability to resist deformation and abrasion.

Deformation is particularly severe in the case of the cone-type pivot operating in a sapphire stone cup as shown in Fig. 3. Radius of the pivot point is less than one-fourth the thickness of a human hair and although the static loading is less than one ounce, the calculated stress at the point of contact is 700 tons per square inch. This indicates the point is in a condition of flow. What actually happens is that both surfaces distort slightly until the stress is reduced to a more normal value. This is considered to be the severest use of material in meters.

Abrasion occurs on the surfaces in contact when these pivots are subjected to the greatly increased stresses of excessive vibration beyond their ability to withstand such stresses, as often happens in aircraft and railroad applications. By abrasion here is meant an actual tearing away of particles on the surfaces in contact. Although the surface of every pivot is polished so that no objectionable scratches or pits can be seen at a magnification of 54 diameters, there are microscopic protrusions which during normal service are broken down by fatigue or cutting action and are separated from the pivot proper.

Fig. 1—Bearing cones at end of shaft are honed to absolute points under 200-diameter magnification on special automatic machines

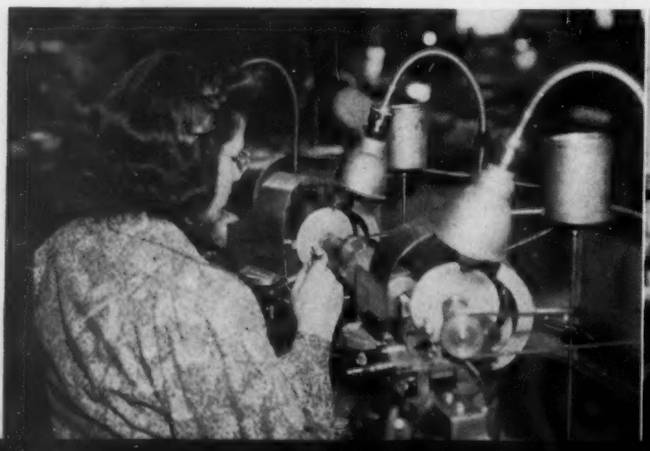


Fig. 2—Meter shafts are polished by tumbling in barrels with water and Vienna lime

These particles immediately oxidize to form an iron oxide which, due to its abrasive qualities, accentuates the wearing process.

Since the many investigations of abrasion in metals have thrown so little light on the subject, it has become necessary to define clearly the amount of wear permissible in meter pivots. This microscopic amount of permissible wear may

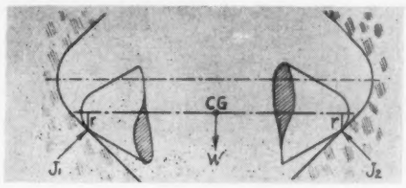


Fig. 3—Radius at pivot point of meter shaft is less than one quarter the thickness of human hair and calculated stress at point of contact is 700 tons per square inch

better be pictured when it is considered that two-millionths of a cubic centimeter of metal worn from a pivot is enough to render certain instruments useless for accurate work.

The machining and inspection of such small meter shafts involving minute quantities presents an entirely different set of production problems than those encountered in ordinary work.

Stock steel is purchased in a condition suitable for machining, and standard automatic Peterman machines are used for cutting the shafts to length and putting an approximate radius on one end.

The next step usually is the hardening operation. Control of both hardenability and cooling rate is such a critical factor in the heat treating of such small parts that it has been a subject of investigation for many years. A small change in the steel or in the quench can cause a large change in surface hardness toughness and the service that can be gotten from the shaft.

To minimize heat loss in the quenching operation, manufacturers both in this country and abroad have resorted to schemes varying from quenching in the furnace to heating in a vacuum tube. One manufacturer uses an electrically-heated gas-atmosphere furnace about 12 inches long with a 4-inch opening. Parts to be heat treated are placed in a tube within the furnace and heated for three minutes. The entire furnace then is tilted and the tube slides forward to a stop at the mouth of the furnace. As the tube hits the stop, inertia of the moving parts "shoots" the work into the quenching media.

After heat treating comes honing. Fig. 1 shows the operator of a honing machine honing a cone on the end of a shaft. Operator observes the cone under 200 diameters magnification and hones it to almost an absolute point. The machine has a honing wheel made from natural hard Arkansas stone. Toward the end of the honing the amount of material removed is so small that the operation approaches burnishing.

To obtain the radius on the cone, the shafts then are placed in tumbling barrels and tumbled for sufficient length of time in a mixture of aluminum oxide, distilled water and steel balls. The radius sought on the cones varies from 0.0005-inch to 0.003-inch, depending upon the use to be made of the shafts. When contents of barrel are unloaded, shafts are separated from the mixture and washed with water.

The shafts then are polished by tumbling them again in a mixture of water and Vienna lime. The tumbling barrels are shown in Fig. 2.

Contour, polish and hardness of the pivots and shafts must not only be carefully controlled but also must be closely inspected. Fig. 4 is a view of the inspection department and the women inspectors who are trained to detect the minutest flaws. Hardness of some of each lot of heat-treated shafts is checked on a modified superficial Rockwell machine.

In inspecting shafts for polish the degree of polish is designated at "no scratches" under a given magnification. The higher the magnification specified at which there are no scratches, the more mirror-like the polish.

And finally, the contour of every pivot is inspected on a projector with a magnification of 200 diameters. Projector used for this is shown in Fig. 5.

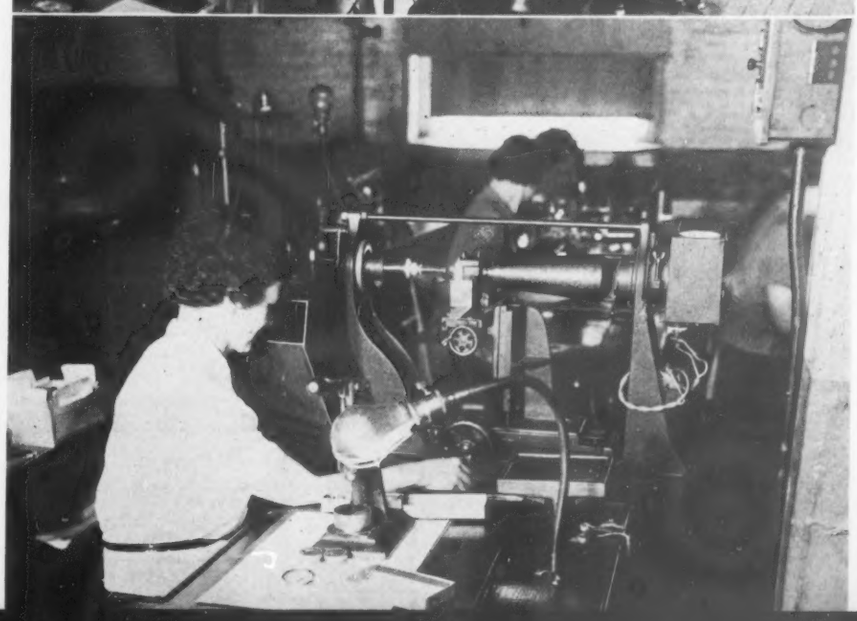


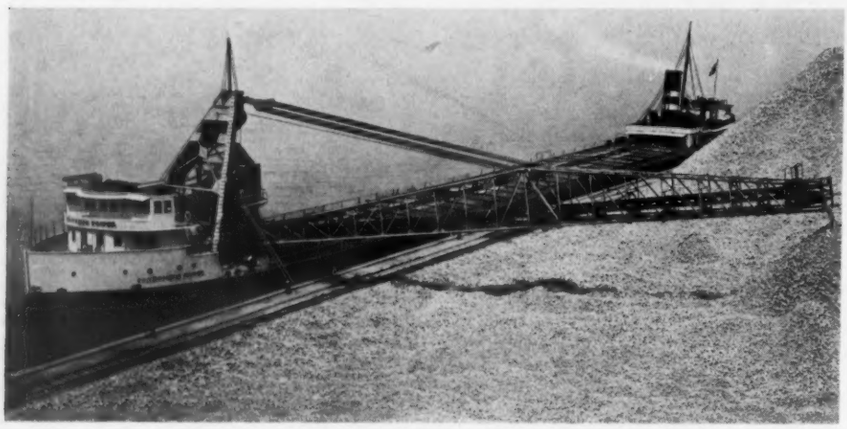
Fig. 4—(upper)—Finished shafts are inspected for contour, polish and hardness

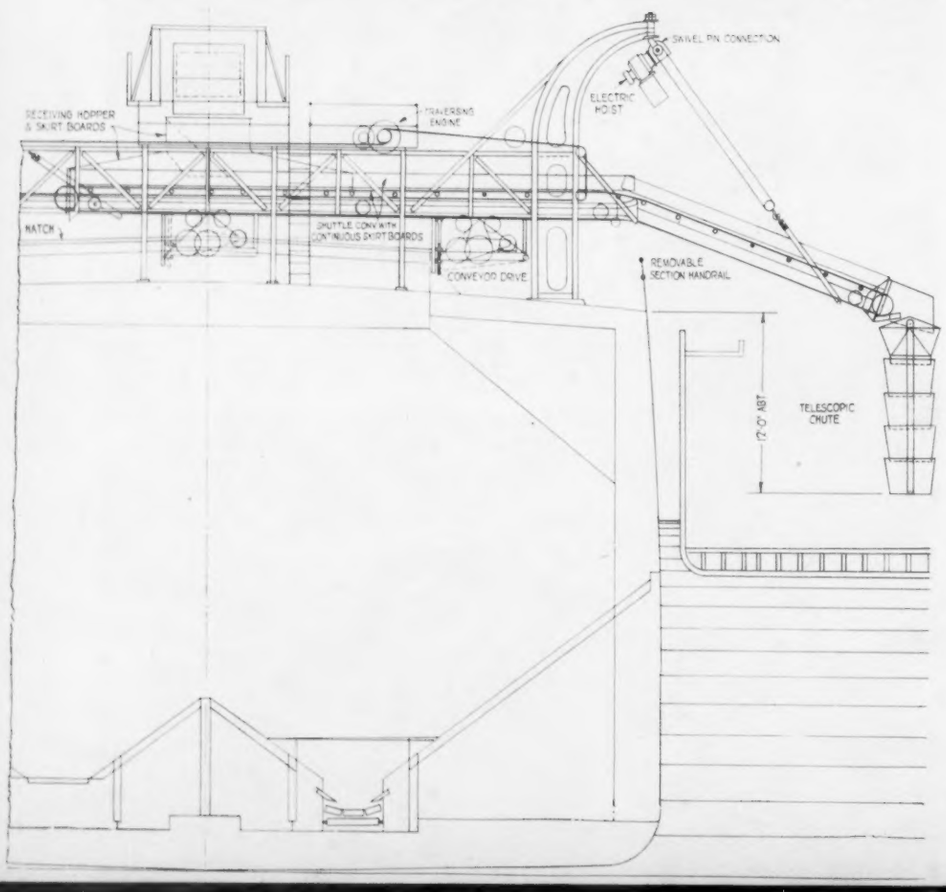
Fig. 5 (lower)—Contour of each pivot also is checked on a projector at a magnification of 200 diameters

Shuttle Belt Conveyor

. . . reduces dropping distance in unloading coal from self-unloading vessel to barge alongside. Fully-enclosed collapsible chute guides discharge and so prevents blowing away and loss of coal dust and fines

■ BREAKAGE of coal and the blowing away of coal fines in unloading from ship to barges tied alongside will be minimized greatly by the transverse shuttle belt conveyor installation aboard the coastwise U. S. S. JASON now being converted to a self-unloader by Bethlehem Shipbuilding Co., Baltimore, for Boland & Cornelius Inc., New York. Complete unloading equipment, furnished by Robins Conveying Belt Co., 15 Park Row, New York, also includes a boom conveyor, chain and bucket elevator, two lengthwise-hold belt conveyors and two crosswise-hold belt conveyors.





Ordinarily self-unloading vessels are equipped with a single-belt boom conveyor for discharge purposes, such as shown in Fig. 2. While this type of boom conveyor can discharge material with minimum droppage when unloading on a dock storage pile, it cannot always unload with the same minimum droppage into a barge or lighter tied alongside. Position or sides of barge usually are such as to prevent boom conveyor being lowered very far into the hold. Consequently, coal is dropped from an excessive height, broken and dust is blown about to become lost. To prevent this, a transverse shuttle belt conveyor has been installed, said to be first of its kind to go aboard a self-unloading vessel. A brief description of the complete installation on the U. S. S. JASON, including this shuttle conveyor follows.

The hold of the ship is being converted into a series of hoppers capable of holding about 10,000 gross tons of coal or an equivalent volume of other bulk materials. At bottom of hold, see Fig. 2, will be placed more than 80 gates through which coal will flow onto the two hold belt conveyors mentioned. These are 42 inches wide and 286 feet long and each have a capacity of 700 tons coal per hour. Cross section of hold and relative posi-

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Fig. 1. (Upper)—A ship similar to U. S. S. Jason now being reconstructed showing usual arrangement aboard a self-unloading vessel. New shuttle conveyor will be placed at boom pivot. Fig. 2. (Lower)—Schematic cross-section of the U. S. S. Jason showing shuttle conveyor in position for unloading into barge and the hold arrangement of gate and conveyor

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New Wire Mill

...completes $1,000,000 expansion and modernization program at Buffalo plant. Space for wire production is doubled. Wire-drawing machines operate at speeds up to 2200 feet per minute. Two new bell-type annealing furnaces added

■ RECENTLY, Wickwire Spencer Steel Co., 500 Fifth avenue, New York, completed a program involving modernization and relocation of a considerable portion of its facilities to meet changing conditions and shifting markets. The company now has one of the most completely integrated plants in the country specializing in wire and wire products.

In recent years, company officials had noted a westward shift in outlets for wire and wire products. Inasmuch as steel production facilities were located at the Wickwire plant near Buffalo and a major part of its wire drawing and fabricating equipment in central Massachusetts, considerable uneconomical cross-hauling of wire rods East and finished products back West resulted.

Construction of a new $1,000,000 plant at Buffalo and closing down the somewhat antiquated Goddard Works in Worcester, Mass., was to improve this situation. Some of the more modern equipment at Goddard was moved to Buffalo to handle peak loads, the balance being sent to Clinton, Mass., works and Morgan Works in Worcester.

Wickwire plant, Fig. 1, is strategically located on about 100 acres of land on the Niagara river approximately north of Buffalo. Two blast furnaces at this plant have an annual capacity of 324,000 tons of basic, foundry and malleable pig iron. Ore and limestone from the upper lakes are unloaded and stocked directly at furnace side.

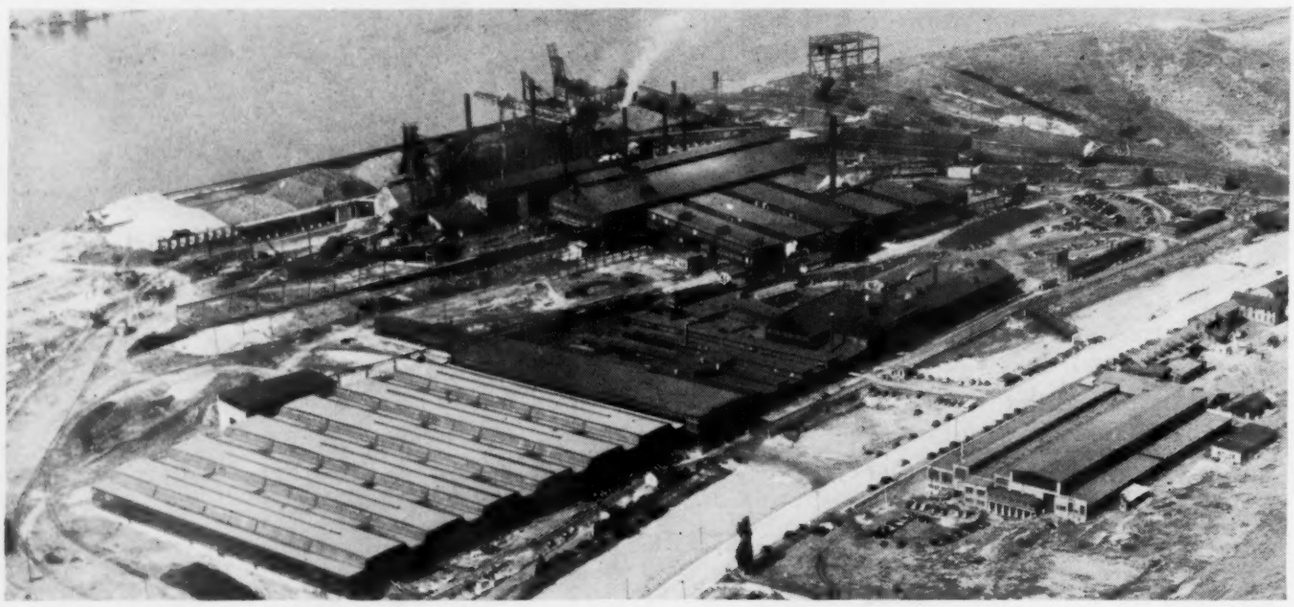
Steelworks here is located back of the blast furnaces, readily permitting use of hot iron. Equipment includes four stationary 60-ton basic openhearths, blooming mill and continuous rod mill. Rods are delivered to the rod yard on a continuous conveyor.

The new mill with 200,000 square feet of floor area more than double the space for wire production. In effect, this addition, lower left in Fig. 1, is a continuation of the old plant, which has been revamped to effect straight line production. The old section houses new gas and electric annealing furnaces as well as annealing and wire-drawing equipment previously located there.

The recent addition is devoted to new wire-drawing and processing equipment. Isteg, a new type of twisted concrete reinforcing bar, (complete description, STEEL, Oct. 24-'38) is produced in a wing on the river side of the new section and partly in the section itself. A portion of the new addition is reserved for future expansion.

The finer wire sizes previously

Fig. 1—Air view of Wickwire works at Buffalo. New wire mill addition is in lower left with shipping department between this and old wire mill adjoining. Next at right are annealing furnaces and laboratories. Above are rolling mills with open-hearth building next to blast furnaces



turned out at Goddard Works will be produced in the new mill while larger sizes will be drawn in the old portion as in the past. Products shifted to Morgan and Clinton works mostly involve lighter specialties where freight is a less important factor.

Wire-drawing equipment in the new addition consists of multipass Vaughn machines, Fig. 2, which reduce rods at speeds ranging up to 2200 feet per minute. These are arranged in three sections, the first reducing rod stock to approximately 0.072-inch, the second to 0.035-inch and the third to 0.003-inch. In actual practice, considerable overlapping in sizes exists between the three sections to permit flexibility in production.

The first two sections comprise dry-type machines, each of which accomplishes six reductions in multiple dies. Tungsten-carbide dies are inserted in watercooled holders to prevent overheating of both dies and wire. Wire takeup blocks also are watercooled.

A soap solution for the wet-drawing multiple-die machines for fine wire in the third section is pumped from centralized storage tanks in the basement to die openings, making possible close control of a uniform solution. This solution is constantly agitated and maintained automatically at 140 degrees Fahr.

Inasmuch as the new equipment is continuous in operation, automatic electric welders made by the Micro Products Co., 20 North Wacker drive, Chicago, are located at the entrance side of each group of machines to join the ends of the wire bundles. Drawing frames also are equipped with roll pointers and automatic power cutoffs, the latter functioning when necessary to join bundles or in case of tangles.

Also included in new section is equipment for producing coppered and tinned wire, as well as single and double lead-patenting furnaces for heat treating specialties such as piano, music, spring, brush and aviation wires. The furnaces are continuous in operation and are controlled automatically to assure uniform physical characteristics.

Straight-Line Setup

Modernization of the older plant includes a straight-line cleaning setup, acid tanks, water wash, sull racks, lime tubs and automatic flash-baker being arranged in order, Fig. 3. Wire in coils is handled from section to section by a novel L-shaped, electrically actuated crane which rides on a single rail in the floor in front of the line on an overhead track.

Feature of the cleaning setup is the flash-baker developed by Morrison Engineering Co., 5005 Euclid avenue, Cleveland, which processes rods in 5 minutes by forcing air at 500 degrees Fahr. against the material at high velocity. This time compares with 6 to 8 hours formerly required for the same operation.

Pot-type annealing furnaces in the old plant have been replaced by bell-type gas and electric bright-annealing furnaces. Each of the two new furnaces has four bases so loading, heating and cooling cycles can be completed without loss of time.

The electric unit, built by General Electric Co., Schenectady, N. Y., has capacity of about 20,000 pounds per 24-hour day and generally is used for special work and small lots. Fans below furnace bases assure even distribution of protective atmosphere inside the inner cover.

The gas unit, installed by Lee Wilson Engineering Co., 1370 Blount street, Cleveland, has capacity of 30,000 pounds and is used to treat production lots. Furnace is 84 inches high with base 62 inches in diameter. It is heated by 15 vertical firing tubes, each equipped with a spark-plug igniter and having a capacity of 120 feet of gas per hour. Inner protecting cover over the charge is liquid sealed.

Planned Materials Handling

In planning the entire mill layout, especial attention was given to material-handling methods as it was desired to facilitate movement of material from one operation to the next and also to reduce manual labor causing excessive fatigue to be experienced by employes

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Fig. 2—Vaughn multipass wire-drawing frame. Six dies reduce rod stock to 0.072-inch diameter in a continuous operation. Note roll pointer in center

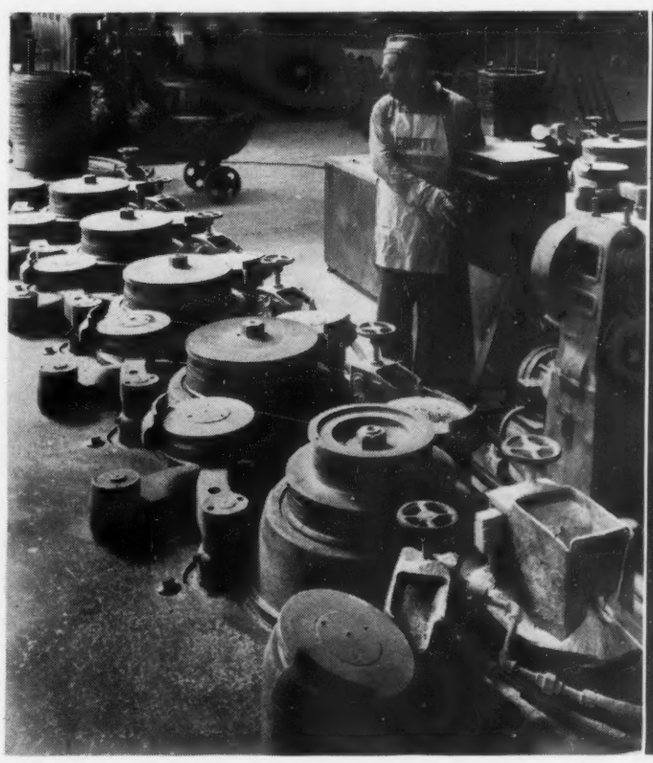

Fig. 3—Gantry hoist with hairpin hook in background spans straight cleaning line, including acid tanks in rear, then rinse water, sull racks, lime tubs and flash baker

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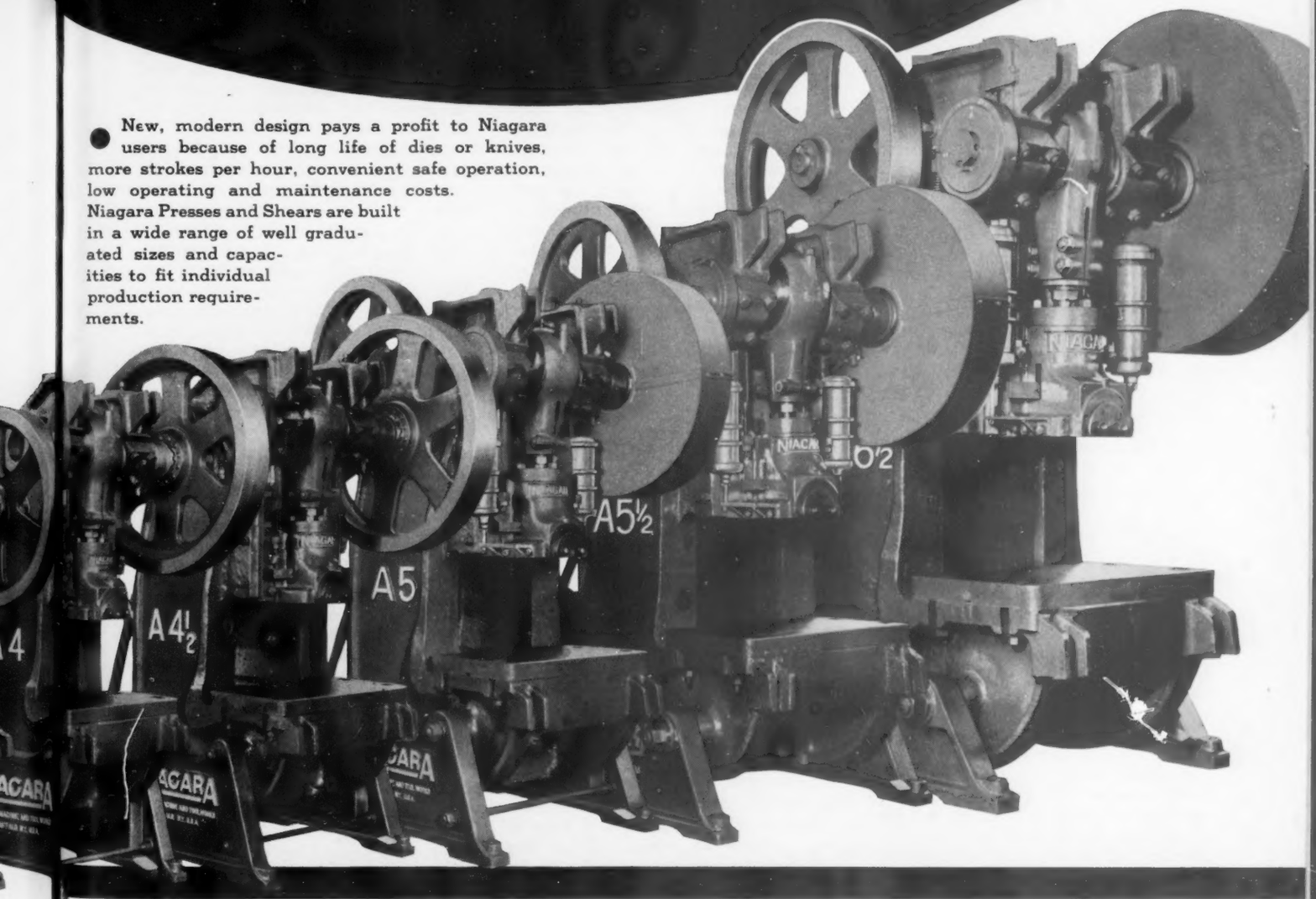

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Precipitation Hardening

Symposium reviews fundamental aspects and takes an inventory of factual information concerning the art to the end that metallurgists gain a better understanding of the phenomena

■ CONDENSED summation of pertinent information dealing with the dispersion hardening of nickel; a resume of the important characteristics of the few dispersion-hardening high-nickel alloys which have been developed commercially; results of an experimental search for effective dispersion hardening in the iron-nickel series as a base; and an elaboration of the application of titanium as a dispersive to the hardening of two important iron-nickel alloys, were presented by A. M. Talbot and N. B. Pilling, International Nickel Co. Inc., Bayonne, N. J., at the precipitation hardening symposium conducted recently by the American Society for Metals.

Mechanism Is Complex

Numerous cases of differential solubility in several of the simple binary alloy series suggested extensive opportunities for the age hardening of nickel. Many of these data relate simply to hardness or microstructure or to a study of special properties which have some power in revealing the nature of the precipitation mechanism. The extent to which these possibilities may be employed usefully is not always clear, as supplementary information usually is lacking regarding the balance between hardness and ductile properties, hot and cold working habits and economics. More or less effective hardening of nickel by the dispersive mechanism has been reported for at least the following elements: Aluminum, beryllium, gold, indium, magnesium, molybdenum, silicon, tin, titanium, tungsten, zinc and zirconium.

It appears to be a general rule that elements which impart dispersion hardening to nickel are nearly always effective in this capacity in more complex nickel alloys formed with one or more of the elements which enter into extensive solid solution with it. Such are: Nickel-copper, nickel-iron, nickel-cobalt, nickel-manganese, and derivatives of these.

A number of nickel-iron alloys were alloyed with varying percentages of titanium and the dispersion hardening reaction studied. Tests made on the low-expansion alloy invar showed titanium to have the following effects: It raised the inflection temperature, raised the lowest attainable rate of expansion and raised the nickel content at which this minimum occurred; maximum thermal hardening occurred at about 3.2 per cent titanium content; proportional limits of 60,000 to 70,000 pounds per square inch were readily developed in comparison with about 20,000 for ordinary invar.

Experimental data bearing upon precipitation hardening in a series of iron-tungsten and iron-molybdenum alloys were reported by W. P. Sykes, metallurgist, Cleveland Wire Works, General Electric Co., Cleveland. In obtaining these data, attention was directed toward (1) observing the effects of various controllable factors upon the age hardening performance and (2) evaluating the limitations of the hardness test as a method of detecting changes which occur throughout the aging cycle.

Precipitation hardening phenomena in the precious metals series were investigated by R. F. Vines and E. M. Wise, International Nickel Co. Inc., Bayonne, N. J. Widest application of these alloys is in the fields of jewelry and dentistry, although the authors suggested possibilities for a profitable wider application of the metals. Equilibrium diagrams of the gold-copper, gold-platinum, gold-silver, copper and silver-copper were analyzed and results of aging tests reported. A ten-fold increase in hardness by aging was mentioned in certain gold-platinum alloys. Results of further alloying precious metals with zinc, palladium and nickel were summarized.

Special Alloys Studied

In research work reported by Robert B. Gordon, research laboratory, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.; and Morris Cohen, assistant professor of physical metallurgy, Massachusetts Institute of Technology, Cambridge, Mass., binary alloys of copper with 3.2 per cent cobalt and 2.4 per cent iron were quenched from 1040 degrees Cent. and aged at 250, 375, 550 and 700 degrees Cent. for periods ranging from 3 seconds to 1000 hours. Changes in hardness, electrical resistance, magnetic susceptibility, remanence and microstructure were followed. Electrolytic polishing and etching and magnetic colloid patterns were used as aids to microscopic examination.

Both alloys undergo a two-stage precipitation process, first at the grain boundaries and then within the grains. In the copper-cobalt alloy, both types of precipitate are ferromagnetic. In the copper-iron alloy, the grain boundary precipi-

To summarize fundamental aspects of precipitation hardening of metals, and thus to stimulate research in developing more and better alloys susceptible to this treatment, was the purpose of a three-session "precipitation hardening" symposium conducted by the American Society for Metals during the National Metal congress in Chicago, Oct. 23-27. Eleven papers containing factual information on the art were presented. In its issue of Nov. 27, page 56, STEEL abstracted four of these papers; the remaining seven are reviewed on the accompanying pages. An effort has been made to concentrate insofar as possible on the more practical phases of a highly theoretical metallurgical concept

tate is ferromagnetic but the general precipitate is initially nonferromagnetic. It later transforms into a ferromagnetic phase.

Hardness rises slightly during the first stage and markedly during the second. Maximum hardness is attained in both alloys after 100 hours at 550 degrees Cent.

Electrical resistance drops continuously at all aging temperatures. It decreases considerably during the first stage and to an even greater extent during the second.

Dr. Cyril Smith, research director, American Brass Co., Waterbury, Conn., speculated on the possible effect of cold working of the author's specimens after precipitation. He suggested that the nonmagnetic iron observed would have become magnetic after plastic deformation. He also cited the possibility of quenching strains having some effect on precipitation, and injected a note of caution on the matter of comparing samples which are not identical in shape and size. Messrs. Gordon and Cohen had one size of specimen for hardness measurements and another size for magnetic and electrical resistance measurements.

Relation between the solid solubility characteristics and the tensile properties of the common aluminum alloying elements was summarized by L. W. Kempf, research metallurgist, Aluminum Research Laboratories, Aluminum Co. of America, Cleveland. Optimum combinations of properties are usually obtainable only by solid solution and precipitation heat treatments. The effect of such heat treatments on properties other than tensile, such as resistance to corrosion, resistivity, density changes, endurance characteristics, etc., also was outlined.

Physical Stability Important

The stability of a material in various environments is probably of equal commercial interest to the tensile properties. Because of the physical characteristics of the oxide film naturally formed on the surface of aluminum, the stability of pure aluminum to most practical environments is excellent. As is usually the case with resistant metals, the corrosion attack on commercial alloys of aluminum is generally electrolytic in nature. Therefore, the most resistant alloys of aluminum are formed by the addition of metals of electropotential differing not greatly from that of aluminum. Thus in the ordinary commercial alloying range, magnesium, silicon and zinc form alloys with aluminum more resistant to corrosion than does copper.

The addition of magnesium to aluminum-copper alloys exercises a profound effect on mechanical properties. Small concentrations of magnesium also greatly increase the resistance to corrosion of aluminum-copper alloys. Apparently a fundamental change in type or manner of precipitation takes place. With some aluminum-copper-magnesium alloys, for example, the commercial alloy duralumin containing 4 per cent copper and 0.5 per cent magnesium, the conditions for optimum mechanical properties and resistance to corrosion require a certain minimum cooling rate from the solution treatment followed only by the precipitation, if it can be referred to as such, which takes place at temperatures not higher than about 200 degrees Fahr.

Electrical resistivity of aluminum increases rapidly with increase in concentrations of alloying elements in solid solution. The resistivity of supersaturated solid solutions is usually much higher than that of the same alloy in the annealed or stable condition.

Tensile strengths higher than 70,000 pounds per square inch can be achieved in aluminum alloys with simple combinations of the ordinary alloying elements. At first glance it might appear unnecessary to go to more complex alloys for commercial products. However, strength is, of course, only one of a large number of properties necessary for

Composition and Properties of Wrought Aluminum Alloys

(FROM PAPER OF L. W. KEMPF)

Nominal Chemical Composition Per Cent of Alloying Elements, Aluminum and Normal Impurities Constitute Remainder					ACOA Alloy and Temper Designation		Yield[1] and Tensile Strengths — Thousands of Lbs. Per Sq. In.		Endurance[2] Limit — Thousands of Lbs. Per Sq. In.	Elongation[3] Per Cent in 2 In.	Brinell Hardness 500 Kg. 10 mm.
Cu	Si	Mn	Mg	Others							
						Class I Aluminum-Magnesium Alloys					
...	...	1.2	1.0	.....	4S-O	Annealed	10	26	14	20	45
					4S-H	Hard-Rolled	34	40	16	5	77
...	...	...	2.5	0.25 Cr	52S-O	Annealed	14	29	17	25	45
					52S-H	Hard-Rolled	36	41	20.5	7	85
...	...	0.1	5.2	0.1 Cr	56S-O	Annealed	18	42	20.5	30	35
					56S-H	Hard Drawn	50	62	21.5	8	100
						Class II Aluminum-Copper Alloys					
5.5	...	...	...	0.5 Pb, 0.5 Bi	11S-T3	Soln. Ttmt.	42	49	12.5	14	95
					11S-T8	Soln. and Ppt. Ttmt.	42	55	....	14	100
4.4	0.8	0.8	0.4	.....	14S-T	Soln. and Ppt. Ttmt.	63	70	16	14	135
4.0	...	0.5	0.5	.....	17S-O	Annealed	10	26	11	20	45
					17S-T	Soln. Ttmt.	37	60	15	20	100
					17S-RT	Soln Ttmt. Cold-Worked	47	65	....	13	110
2.5	...	...	0.3	.....	A17S-O	Annealed	8	22	....	24	38
					A17S-T	Soln. Ttmt.	24	43	13.5	24	70
4.0	...	.	0.5	2 Ni	18S-T	Soln. and Ppt. Ttmt.	47	62	....	17	115
4.4	...	0.5	1.5	.....	24S-O	Annealed	10	26	12	20	42
					24S-T	Soln. Ttmt.	44	68	18	19	105
					24S-RT	Soln. Ttmt. Cold-Worked	55	70	....	13	116
					25S-T	Soln. and Ppt. Ttmt.	37	57	15	21	105
						Class III Aluminum-Magnesium-Silicide Alloys					
0.8	12.0	...	1.0	0.8 Ni	32S-T	Soln. Ttmt.	48	56	14	7	125
...	1.0	...	0.6	.....	51S-O	Annealed	6	16	6.5	30	28
					51S-W	Soln. Ttmt.	20	35	10.5	24	64
					51S-T	Soln. and Ppt. Ttmt.	40	48	10.5	14	95
...	1.0	...	0.6	0.25 Cr	A51S-T	Soln. and Ppt. Ttmt.	41	47	10.5	20	100
...	0.7	...	1.3	0.25 Cr	53S-O	Annealed	7	16	7.5	25	26
					53S-W	Soln. Ttmt.	20	33	10	22	65
					53S-T	Soln. and Ppt. Ttmt.	33	39	11	14	80
						Class IV Aluminum-Copper-Magnesium-Zinc					
1.0	...	0.7	0.4	10 Zn	70S-T	Soln. and Ppt. Ttmt.	45	54	19	20	115

[1]Yield strength is the stress which produces a permanent set of 0.2 per cent of the initial gage length.

[2]Endurance limits are based on withstanding 500,000,000 cycles of completely reversed stress using the R. R. Moore type of machine and specimen.

[3]Elongation on $\frac{1}{16}$-inch sheet specimens unless otherwise indicated.

commercial utilization. As a matter of fact, few binary alloys are used commercially, principally because better combinations of properties can be obtained by the use of several rather than one or even two alloying elements.

The commercial high strength aluminum alloys may be divided into classes more or less directly related to certain of the simpler systems. These classes may be referred to as: (1) Aluminum-magnesium alloys; (2) aluminum-copper alloys; (3) the aluminum-magnesium-silicide alloys; and (4) the aluminum-copper-magnesium-zinc alloys. It is to be understood, of course, that this classification is far from being rigid. A great deal of overlapping occurs, and in many cases a specific commercial alloy might be classified in any one or two or more different divisions.

Strength Not Prime Factor

In the wrought alloys, corrosion resistance, ease of fabrication, and formability may be of greater industrial importance than strength itself. Similarly, in the castings field ease of fabrication or castability may be of greater importance than potentially high tensile strength. The strength of a casting depends not only on the potentiality of the alloy for developing high properties, but to an even greater degree on the soundness and integrity of the casting. Frequently castings of an alloy having a relatively low potential strength may be actually of greater utility even from a strength standpoint than castings of an alloy having high potential strength but relatively poor castability.

W. L. Fink, D. W. Smith and L. A. Willey, Aluminum Research Laboratories, New Kensington, Pa., presented results of work during the past few years on the precipitation-hardening of some high-purity aluminum alloys. First they reviewed published data and then presented new data on the effect of a third element on the room temperature aging of aluminum-copper alloys. The added elements investigated were magnesium, silicon, manganese and iron.

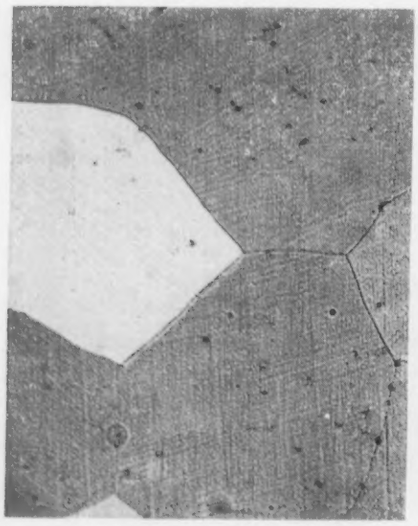
Results were explained in terms of the theory of precipitation-hardening: Age-hardening results from the controlled decomposition of a supersaturated solid solution. This decomposition is accomplished, as in other systems, by means of the formation of nuclei of a second phase and the growth of these precipitated particles. The nuclei form by the normal process of chance grouping of solute atoms, and Widmanstatten precipitation. Growth of the precipitated particles occurs by the usual process of crystal growth. The changes in physical and mechanical properties are explained in terms of this normal precipitation process.

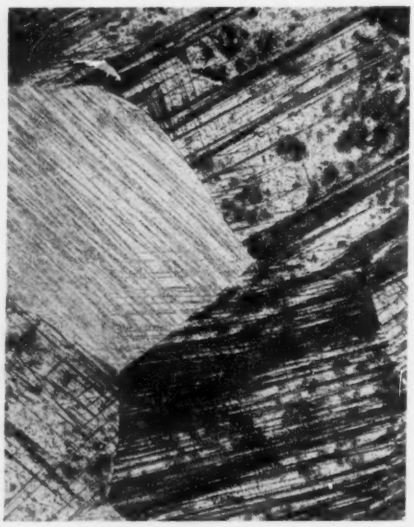
Theoretical consideration of the role of strain in precipitation reactions in alloys was developed by R. H. Harrington, research metallurgist, General Electric Co., Schenectady, N. Y. He pointed out that all metals and alloys are crystalline in the solid state and all crystalline materials possess atomic structures of definite and specific geometrical types. These atomic structures are termed "lattices." In the complete absence of strain, each atom occupies a specific geometrical location, a sphere of influence, with respect to its neighboring atoms in the lattice. When these positions deviate from the typical locations by any measurable degree, the metal or alloy has become strained.

Certain means of effecting strain are as follows:

1. Rapid cooling during solidification. In the case of solid solution alloys is added the factor of cored grains: Chemical composition gradients within single grains.
2. Rapid cooling from the solidification temperature to room temperature.
3. Rapid cooling through the temperature range of a phase change or an allotropic transformation.
4. Mechanical application of stress at temperatures below those effecting recrystallization.

Seven examples were cited by the author in classifying the role of strain in precipitation-hardening.





Photomicrographs X 70 of same area of 14-gage aluminum alloy sheet containing 4 per cent copper after aging at 152 degrees Cent. for 2 minutes (left) and 240 hours (right). Increased sharpness of pattern is explained by gradual increase in number and size of precipitate particles. From paper of W. L. Fink, D. W. Smith and L. A. Willey

Idle Time in Machines

(*Concluded from Page* 39)

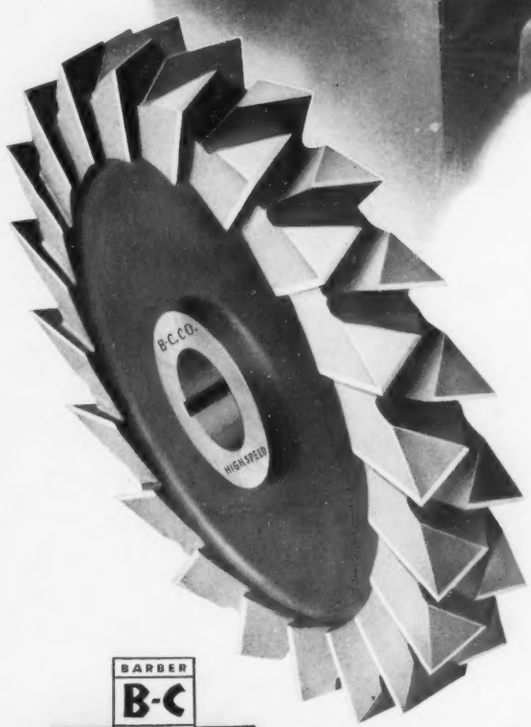
shifted over to bring a fresh group of teeth into action—thus avoiding the usual shutdown involved in changing cutters.

In the case of Fig. 2, the efficiency of an Ex-Cell-O precision boring machine has been pushed close to its theoretical maximum through use of a hydraulically operated, shifting type of fixture. The parts, which are cast iron wheel cylinders for hydraulic brakes, are loaded three at a time while three others are being bored. The parts are dropped on V-blocks and hydraulically clamped between centers. At the end of the boring stroke the cutting tools automatically are retracted by action of air cylinders at the rear of the spindles before the table returns to starting position.

Earlier in this article mention was made of improvements in station-type machines which made practically all of the tools work about all of the possible time. This principle is illustrated by Fig. 3 which shows the tooling setup of a new six-spindle Conomatic. This was one of the machines exhibited by the Cone Automatic Machine Co. at Windsor during the recent Vermont machine tool demonstrations.

Note that every tool both on longitudinal and transverse cross slides, is opposite a piece of work in some one of the six spindles in the head—which head incidentally is arranged for quick indexing. Note also that one of the tools—a reamer—is arranged to feed further and at a speed greater than that of the slide on which it is mounted, thus improving its efficiency as a reamer and avoiding a long stroke for the main longitudinal slide or turret.

B-C Cutters



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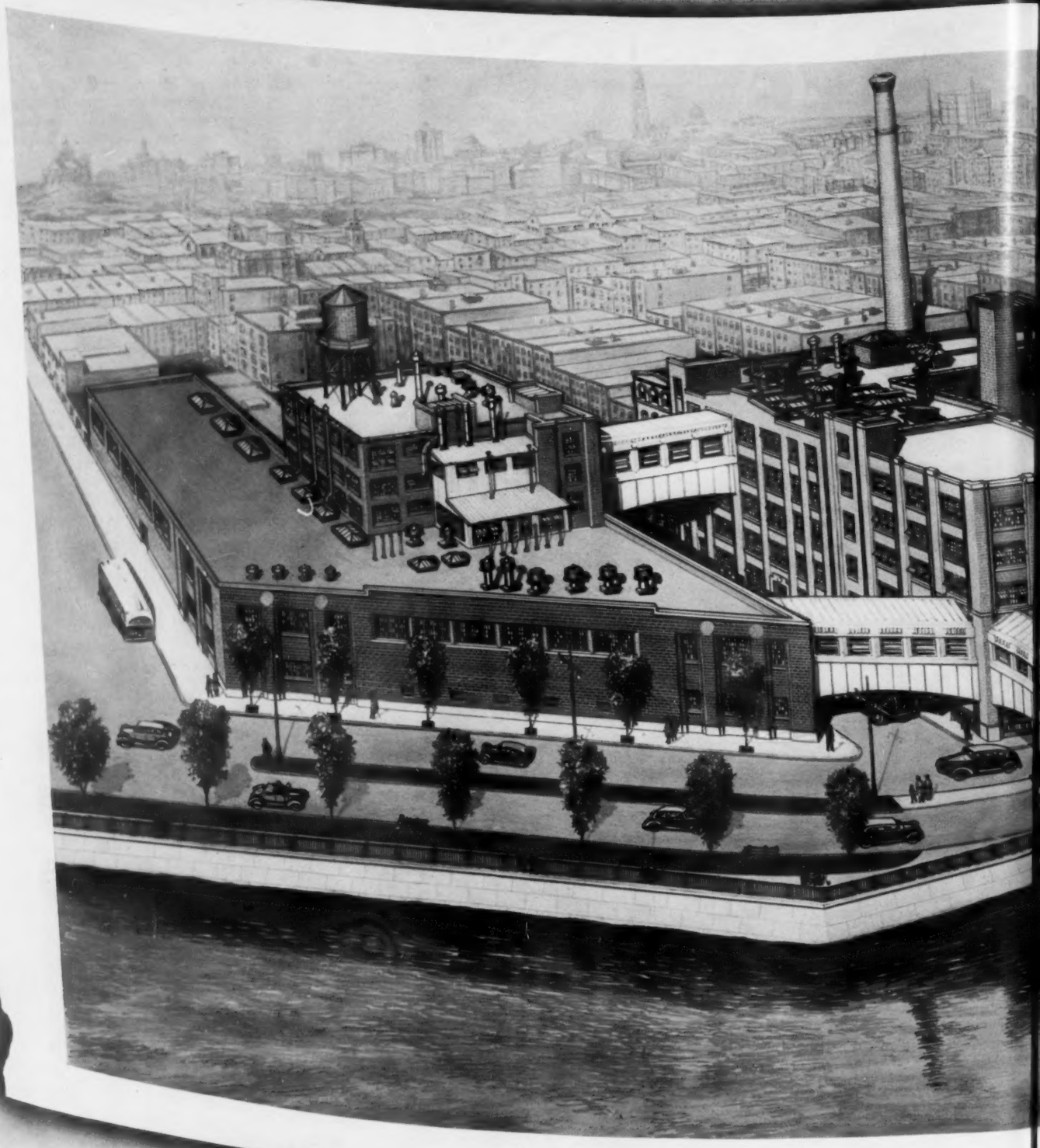

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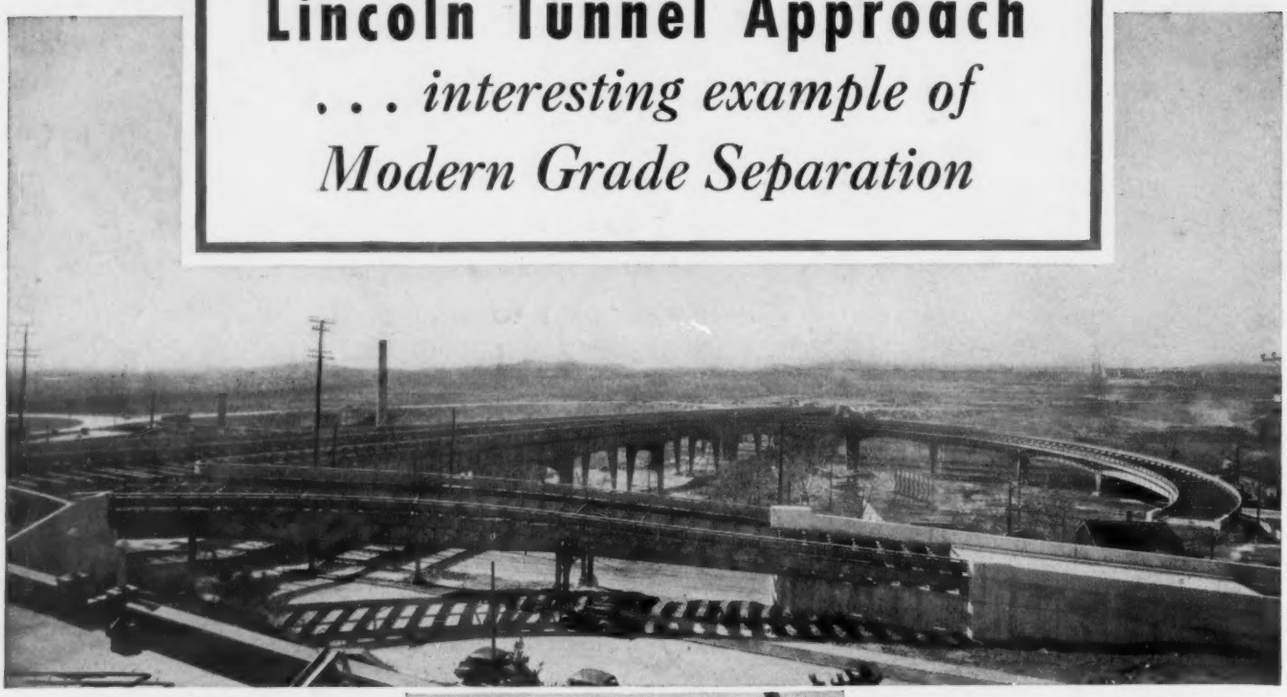
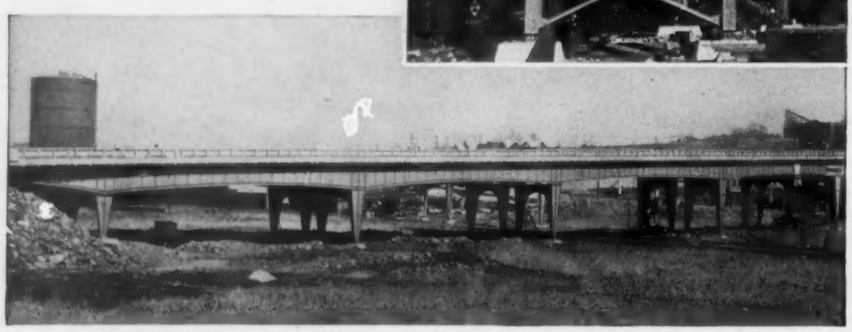


Above—*Plan view of Lincoln Tunnel Approach at North Bergen, N. J. Main highway (left) is a dual-roadway viaduct 1152 ft. long, carried on 4 lines of continuous plate girders. Separated by a plate and angle railing, each roadway is 32 ft. wide with 2 ft. 6 in. and 3 ft. 4 in. sidewalks. Circular ramp to Route No. 1 (background) is 610 ft. long, and ramp along Patterson Plank Road (foreground), 195 ft. long.*

Center—*Erecting the looping ramp from Route No. 1 to the main approach. Steel roadway deck, on grade, curve and super-elevated, is carried on 2 lines of longitudinal plate girders supported on braced bents.*

Bottom—*Part elevation of the main approach viaduct, which consists of 9 continuous, plate girder spans of varying lengths from 50 to 161 feet. Typical of the construction are the pleasing lines of the curved flange girders on 1 rigid frame bents.*

Built for The Port of New York Authority, J. C. Evans, Chf. Engr.



UNIQUE among today's grade separation projects is the Lincoln Tunnel Approach between State Highway Route No. 3 and Prospect Avenue at North Bergen, N. J.

Framed as a continuous, multiple span, deck plate girder structure, this intricate steel viaduct comprises a dual-roadway main unit overpassing existing highways and the Erie Railroad tracks, a looping ramp connection with Route No. 1, and a second exit ramp along Patterson Plank Road.

The main approach highway is divided, by means of a steel curb and railing, into two separate roadways, each independently framed with 2 lines of carrying girders supported on rigid frame portal bents. The two single-roadway ramps are similarly framed, though further complicated by grades, curvatures and super-elevations.

This interesting application involved some 1960 linear feet, and 5400 tons of exacting steel fabrication, and erection, all satisfactorily done — on time—by American Bridge Company.

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UNITED STATES STEEL

Welded Railway Trestle

Cost of trestle is cut one-third by employing unique arc-welded all-steel design. Saving includes allowance for scrapping of temporary fabricating plant at site. Fabrication and erection done by regular railroad forces

By **THOMAS H. GARDNER**
Structural Engineer
Florida East Coast Railway
St. Augustine, Fla.

■ TRESTLE of Florida East Coast Railway where main tracks cross the St. Lucie River at Stuart, Fla., is unusual because it involves a new type of all-welded steel construction and because all parts were fabricated at the site by railway forces using the simplest kind of equipment. The design employed provides not only a higher factor of safety but a much more rigid structure.

Even after writing off loss in dismantling the fabrication plant, approximately 15 per cent of construction cost was saved by fabricating the equipment at the site. Doing all work at one location was found an important advantage. Another feature was that pile cutoff was used for certain details. With all the work concentrated at one location, supervision was facilitated. Nearly 50,000 lineal feet of shop welding was employed, with some 9600 lineal feet of field welding in erection.

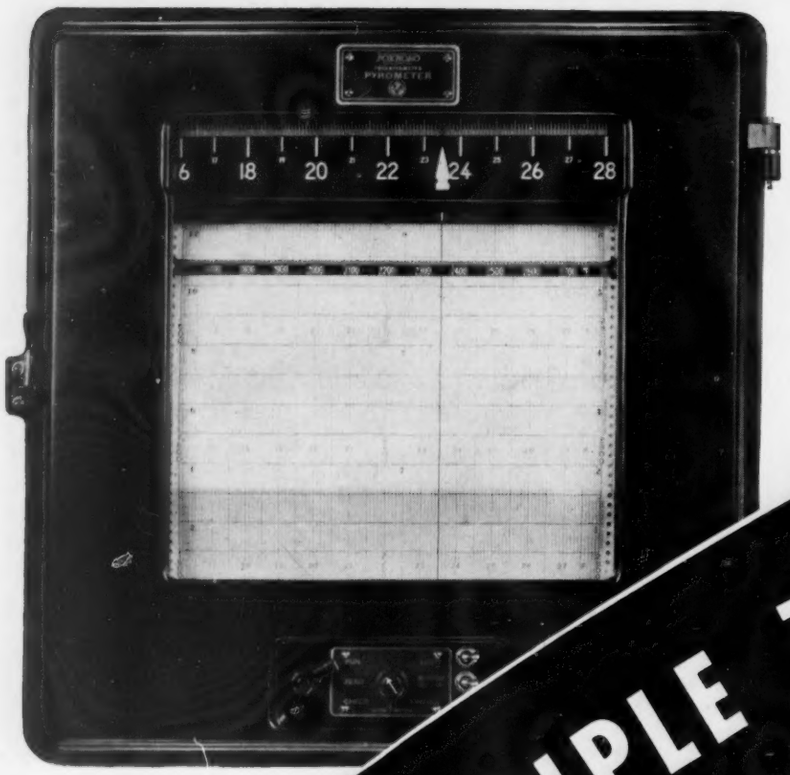
This trestle is believed the first of its type. Most important of all, total cost of the structure is about one-third less than any other permanent construction yet developed.

Previous to 1925, this river crossing consisted of a swing draw bridge, connected by approaches, 70-foot deck girder spans on concrete piers encased in steel cylinders. In 1925, a double-track bascule span replaced the old swing span and a temporary runaround pile trestle was erected; see lower view, this page. It was the intention then to build new double-track approaches using 70-foot deck girder spans carried on concrete pier. Considerable study was given to designs for approaches to determine the most economical type. After studying various combinations, it developed that an arc-welded steel trestle was the most economical type of permanent construction. This was adopted for single-track operation with provision for double track in the future.

Final design consisted of alternate continuous and simple spans carried on bents of four piles each, all piles being battered, or fanned out. Webs of piles are at right angles to longitudinal center line of track. This design affords the lateral strength required and was followed out for all bents except those just north and south of the bascule span, these being 3-pile bents, all plumb. To

From paper receiving award in $200,000 contest sponsored by James F. Lincoln Arc Welding Foundation, Box 5728, Cleveland.

Upper, pile driving and erection. Lower, closeup of bent, showing cap without cover plate, transom beam and wrought iron sleeves over piles with temporary wood trestle in background



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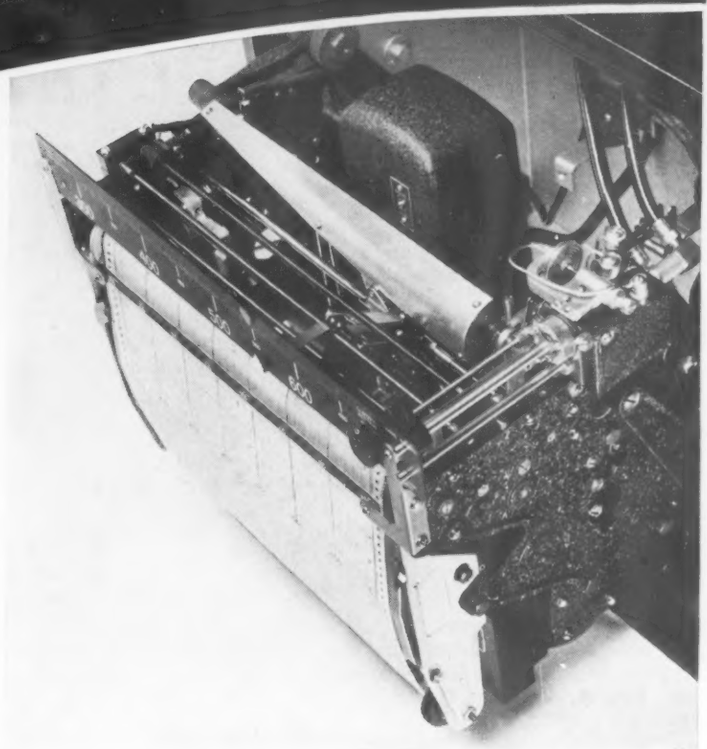
This cam positions a friction roller by which the movement of the integral slide-wire contact, recording and control actuating carriage is positively determined.

2 **INTEGRAL RECORDING AND CONTROL MECHANISM.** In the new Foxboro Controllers, measuring, recording and controlling are, *and cannot fail to be*, exactly coordinated operations. The slide-wire contact, recording pen and cam follower actuating the control cam are assembled as a unit on the same rigid carriage. No linkages, belts or gears transmit the position of one to the others. Simplicity here means accuracy in service.

3 **COMPLETE FLEXIBILITY IN CONTROL.** The control system is affixed directly to the shaft of the cylindrical control cam, eliminating linkages and making for a compact, self-contained unit. The rotary motion of the control-cam shaft makes for extreme simplicity in providing for multi-point electrical control, electrical throttling control, or STABILOG air-operated throttling control, as required by application conditions.

CONTROL THE PROCESS AND

TEMPERATURE VARIATION



Shown at right is the Pyrometer model incorporating the Stabilog system of air-operated throttling control—an instrument competent to meet the most difficult conditions of "upset" or process lag *smoothly*, without "hunting" or drifting of the control point. Note accessibility of interior.

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"On-off" or *"high-low"* control has knife-edge selection with no dead spot, thus preserving the precision provided in the detecting mechanism. *Throttling controls* carry out, in the control system, the sensitivity which originates with the measuring and detecting operations. *Reset* and other auxiliary actions are properly designed to meet the conditions of load changes. *Stabilog control* has been perfected through years of study of the characteristics of difficult process problems.

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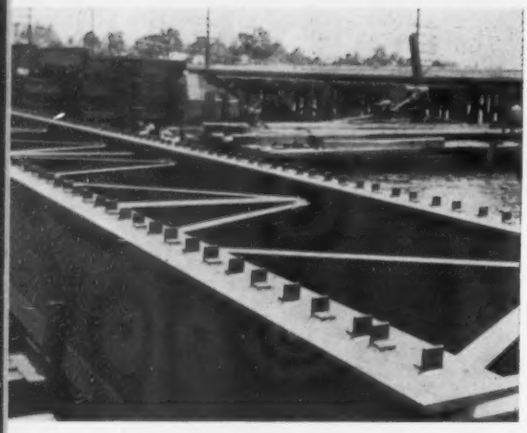


Portion of 80-foot continuous girder with short angles welded on top surfaces to hold bridge ties in place

reduce the depth of the span and attendant reduction in height of backwall, a shallow short simple span was used at both ends. South approach is approximately 800 feet long and north approach about 400 feet long.

Bent spacing in the continuous spans was 23½ feet, 30 feet and 23½ feet. This ratio provided approximately the least maximum bending moment with a fairer proportion of bent reactions. Bent spacings at the simple span which alternates with the continuous beams were 28 feet. A cantilever bracket extends out 1 foot 3 inches beyond the bent to carry the reaction of the simple span, reducing effective length of the simple span from 28 to 25½ feet. Design loading is Coopers E 60. One ply, 36-inch wide, 160-pound flange beams were used for the continuous girders, and also for the simple span.

Wide Flange Beam Used

Instead of conventional built-up crossframes, a 21-inch 59-pound wide-flange beam was used. Squared off at the end, these crossframes are connected directly to webs of the 36-inch beams. Intermediate crossframes were 10-inch 49-pound wide-flange beams with a bracket of same section stiffening the bottom chord. The 21-inch crossframes were spaced 5 inches below the top of the 36-inch beam and 10 inches about the bottom. Diaphragms inserted top and bottom stiffen the chord.

Four and five-inch Tees split from 8 and 10-inch standard beams were used for laterals. Both flange and stem of laterals were tapered off at ends, reducing the section to practically a point. This avoids the high stress concentration attendant with square-end sections. Top lateral gussets are a Tee section, 4 x 14½ inches with a stem 4 inches high. The stem is welded to the under side of the top chord. These lateral connection Tees were cut from the 14-inch pile cutoffs, effecting a saving of material.

Simple spans were shallowed up at the end by removing a section of the web, bending up bottom flange and welding to the web. Web is reinforced on shallow side by side plates. End reaction of the simple span is carried on the cantilever seat on ends of the 80-foot continuous girders. While this design added to fabrication cost, it reduced effective length of the span 9 per cent with attendant greater reduction in weight, avoided use of two sets of pedestals on the end bent with attendant saving and reduction in eccentric loading which would have been imposed, also it facilitated correction in length of simple spans in the field to take care of inaccuracy in driving piles. In addition, it provided accessible details, easily maintained and corrected.

Continuous girders are held down by large washers secured by bolts. Lateral movement is restrained by stops on pedestals. Horizontal anchorage is effected by field welding triangular shaped stop plates on the under side of girders.

Instead of usual guard timbers, pairs of short angles with their toes pointed together are welded on the top flange as shown in accompanying illustration of the continuous girder. Bridge ties have a narrow slot to clear the horizontal legs of the angles and thus are held from movement in either direction. Inner guard rails are installed.

In designing the bent, it developed that a bent of plumb piles was uneconomical for an unsupported height of 30 feet unless submarine bracing was used. It was found that a 4-pile bent with all piles battered, or fanned out, and the inner section of the projecting center line of piles at different elevations, would provide maximum rigidity with the least loading. As top of rail is only 12 feet above mean low water, any bracing would necessarily have been shallow and was found unnecessary.

Transom Beam Protects Pile

The cap consists of two 18-inch 58-pound channels with backs welded to flanges of the piles and with a cover plate on top. About 3 feet above the water line, a transom beam of two 10-inch channels is welded on the bent similar to the cap. Transom beam protects piles from damage from collision by making the four piles act together and reduces at the cap bending from lateral forces.

To protect the piles at the water line, wrought-iron plates were shaped to fit between flanges and web of pile sections, then were joined to outside flat plates by narrow bars inserted near the edges and all welded, using a pile section as a templet with thin shims to provide clearance. Such a 6-foot sleeve was slid down over each pile immediately below the transom line after piles were driven and set approximately 3 feet above and 3 feet below the water line. Sleeves were field welded to the pile at top to make a water seal.

Body of pedestals was made from 14-inch pile cutoffs, cutting off 7 inches on one flange and 19 inches on the other. Top of pedestal, or 7-inch section, is extended out 5 inches on either side with plates, making the top of each pedestal 7 x 24 inches.

Stiffener plates are set between flanges on 4-inch centers at top and 13-inch centers at bottom. A 4 x 12-inch pad is welded on top of each pedestal to provide a bearing for girders. Two-inch blocks welded on top clear the 12-inch flange of the girder about ⅝-inch. This provides space for thin shims on either or both sides as required for lateral adjustment. Pedestals were field welded directly to the bent cap.

Girder flanges are held to stiffeners by 1½-inch bolts and large washers. If vertical shims become necessary, they may be placed on the pedestal pad and the adjustment made in the pedestal bolt.

Double Track Possible

The new all-steel trestle approaches are built single-track on the common center line between the two main tracks. When it becomes economically justified to build a double-track bridge, it can be done by widening the bents. Additional piles will be driven on either side and the cap extended, two more lines of girders and crossframes installed. Then it will only be necessary to shift the deck. If the structure had been built on the center line of either of the two tracks, a duplicate trestle would have been required for double-track service.

Due to elastic deformation of the 36-inch girder beam, there can be considerable settlement in an individual bent without seriously overstressing the girders.

In fabricating this trestle, approximately 750 tons of structural steel plate and shapes were employed. Cutting was done largely by automatic torch and a portable carbide generator. About 50 tons of webs from old girders were cut up and used in lagging the piles.

In shop assembling girders, crossbeams first were laid on track rails in the fabricating shed and leveled. Girder beams then were set on these crossbeams and crossframes set in. After clamping the girders together using vertical angles on the outside with rods running across, any lat-

(Please turn to Page 76)

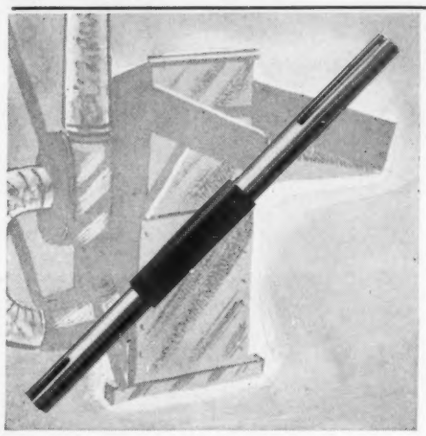
Stressproof News

T. M. REG. U. S. PAT. OFF.

Presenting News of a New Cold Finished Steel Bar

By LA SALLE STEEL COMPANY — **Chicago, Illinois**

EXTRA! Manufacturer replaces SAE X-1314 with STRESSPROOF No. 2 for piston and spindle on tapping machine. Result: Elimination of salt bath case hardening and straightening operations, feerdom from warpage, and lower parts costs.



MINIMIZES WARPAGE IN HAMMERMILL SHAFT

Obtain Perfect Balance of High Speed Part with STRESSPROOF

Any good mechanic knows that the faster a shaft travels, the greater is the need for accuracy and perfect balance. That's why manufacturers exercise extraordinary care in turning out hammermill shafts. Up to several months ago a well known shop had been using *heat treated, hot rolled* steel, T 1345, for these parts.

But this steel, like many others, warped badly not only during machining, but also in service because of residual strains and nonuniformity within the bar. At 4,000 r.p.m., the normal speed of the shaft, such warpage often had serious consequences—excessive vibration and even break-down of the equipment.

A switch to STRESSPROOF No. 2 solved the problem. It is machined as received, with a minimum of warpage, its use eliminating all straightening operations and many rejections.

In use, these shafts maintain perfect balance with minimum warping as the STRESSPROOFING process eliminates stresses and thus successfully minimizes deforming tendencies.

It is also reported, as further evidence of the maker's satisfaction, that STRESSPROOF machined at higher rates than the former steel, cost less, and the labor time required in balancing the equipment was considerably reduced.

Jobber Stocks Established To Meet Maintenance Requirements

Maintenance engineers and shop repair men agree that availability is a very important point in the consideration of materials for repair parts. For that reason jobber stocks of STRESSPROOF have been established at strategic locations throughout the country. Thus, in addition to cutting down steel bar inventories and simplifying buying for a wide range of special uses, the user is assured quick service on emergency needs.

Shops Find That New Bar Steel Is Ideal for Maintenance and Repair

In Many Industries STRESSPROOF Has Replaced SAE 1020, 1045, 3135 and 4140 for Wide Variety of Uses

From users in a score of industries, as widely separated as tobacco and milk, come reports that the new steel bar known as STRESSPROOF is now rapidly gaining recognition as the ideal material for maintenance and repair parts.

Taking a leaf out of the machinery maker's book, the maintenance engineer has discovered that by using STRESSPROOF Bars, he can: 1) meet the requirements of a wide range of repair parts with a single grade of steel instead of several; 2) produce long wearing high strength parts such as bolts and pins at machining rates approaching SAE 1112 and at medium cost; 3) produce intricate machined parts such as lead screws with a minimum of warpage and without sacrificing strength; 4) reduce inventory, save storage space, eliminate possibility of "mixed" steel, and reduce possibility of getting "caught short."

Here are some typical experiences: one group of users, not satisfied with SAE 1020 and SAE 1045 for repair parts, tried hot rolled alloy steels, but due to the variance in physical properties of these steels as received, the users were still dissatisfied with the results. Then they tried STRESSPROOF with its uniform physicals, remarkable wearability and free machineability right in the bar as received and report complete satisfaction with results.

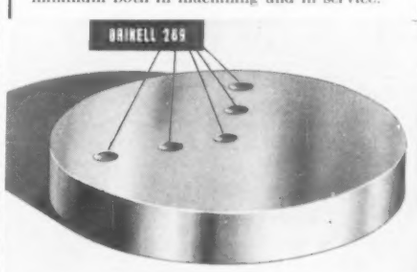
Another group, recognizing the inadequacy of any of the grades mentioned above, sought their solution in heat treated alloy steels. But the high price paid for qualities not required in the parts plus the poor machineability and warpage common to heat treated steels, dictated a trial of still other grades. Again STRESSPROOF provided, *right in the bar as received*, all required qualities: a high degree of machineability combined with more than sufficient strength and resistance to wear for the parts in question. Unusual freedom from warpage and a moderate price were further features in favor of STRESSPROOF.

In still other maintenance departments this steel has been successfully substituted for carburized carbon and alloy steels. The wearability and strength of STRESSPROOF is dramatically exemplified in this case: In a large mill, bolts and nuts which were made from SAE 1020 and heat treated SAE 3135 and SAE 4140, and used on one of the machines had been retarding production by breaking at the rate of six or seven bolts per 8-hour shift. STRESSPROOF bolts—not heat treated, it must be emphasized—had a service life of from ten days to two weeks!

The wide range of STRESSPROOF for repair and maintenance applications may be judged by this partial list of industries now using it: Canning, food, packing, soap, tobacco, paper mills, machine shops, chemical, and milk. Among the parts being made from this single grade of steel are stub shafts, power take-off shafts, keyed shafts, splined shafts, rollers, lead screws, gears, cams, washers, and screws.

Brinells Illustrate Uniform Hardness of STRESSPROOF

The Brinell readings shown below illustrate the uniform hardness of STRESSPROOF No. 2 from center to outside of the bar—one of the factors that reduces warpage of this steel to a minimum both in machining and in service.



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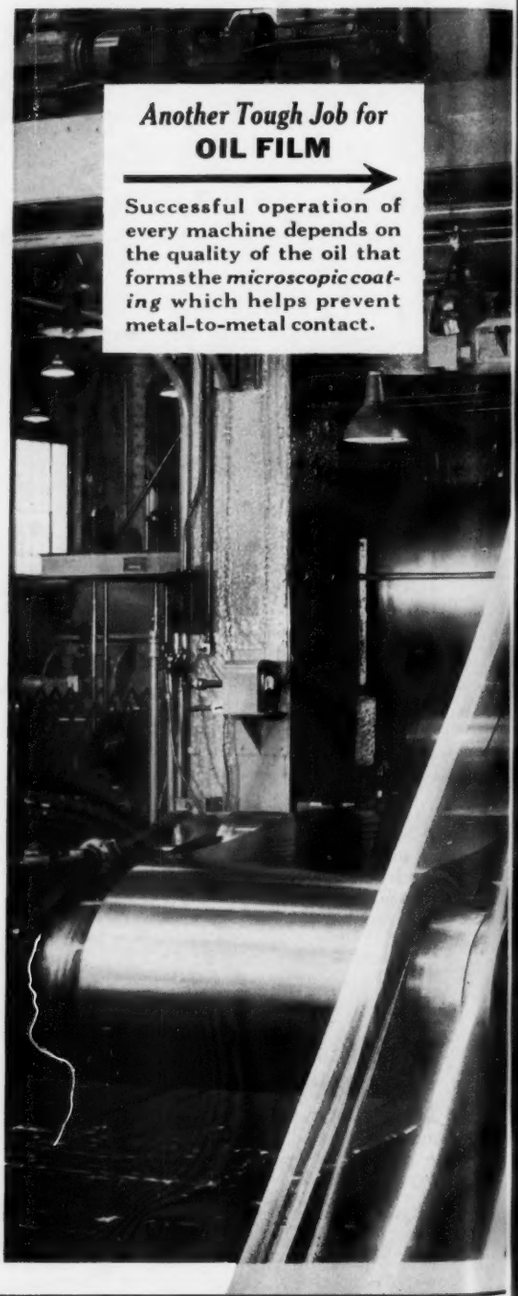
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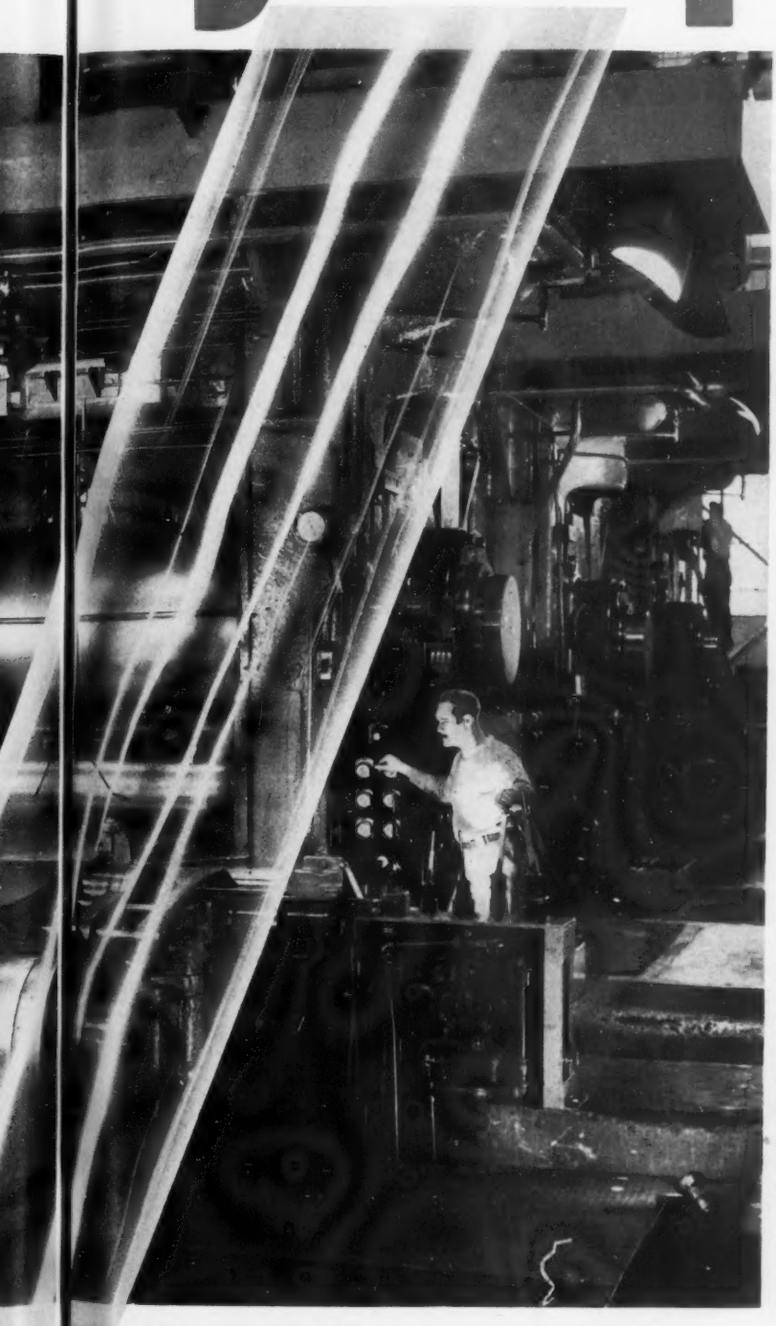

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Unit Punch Setups

New method for high production work punches holes from various angles simultaneously, assures die alignment, is fast and safe. Equipment salvaged almost 100 per cent when design or model changes may be necessary

■ USE OF recently developed hydraulic punching and stripping units makes available a number of important new advantages in all types of punching, embossing, notching and trimming work. These units made by Progressive Welder Co., 737 Piquette avenue, Detroit, are especially recommended for jobs where holes in two or more thicknesses of material must be in absolute alignment. Holes can be punched in one operation through a number of pieces of material since these units have sufficient punching power and can be placed in such position as to punch after the formed parts have been welded together. This eliminates necessity for punching oversize holes to allow for manufacturing variation.

These units can be located in fixtures to pierce holes from various angles in one operation, thereby eliminating costly and complicated cam dies. Constant alignment between punch and die is obtained by means of long bearings of main cylinder and two sturdy guide pins. Stripping is positive, controlled by hydraulic pressure through center of hollow guide pins. Punches and dies are standard and interchangeable, capable of piercing material up to No. 11 gage (0.125-inch).

Punching fixtures may be provided with either individual power sources for large scale production or a group of them may be connected to a single power source. The latter arrangement is particularly advantageous where production is somewhat more limited, to where the fixtures may be operated one after the other instead of simultaneously.

Simplifies Setups

Where it is desired to furnish replacement parts on models out of production, the use of such fixtures with their dies permits a simple setup for running such quantities as are required for service stocks at the time, segregating this work from production departments and eliminating costly press setups.

The units perform punching operations on any type of curved, varied angle or irregularly shaped pieces. This permits all punching operations on a piece to be performed at one time. Each individual unit will punch either one or a group of holes at one stroke, depending entirely upon size of holes, thickness of metal to be punched, size of punching unit and capacity of power unit.

All units can be fitted to take standard interchangeable punches and dies. In addition to handling all types of punching operations, the units also can be used for embossing, notching and trimming operations.

This flexibility permits greatly increased production by lessening the handling of material from one machine to another, thus lowering manufacturing costs. These units also contribute to safety since there are no moving mechanisms, flywheels, gear drives and such hazards. Also their use relieves the press departmen which generally is overloaded and permits punching operations to be performed directly in manufacturing division along with other operations.

The units can readily be assembled to form many various types of production fixtures. Design and construction of the fixtures can be done by the user in his own plant or by the manufacturer of the punching unit. In either case, each punching and stripping fixture is a completely self-contained machine with power unit and fluid reservoir of more than ample capacity for the requirements. For large and irregularly shaped products, special clamping devices are built into the fixture or punching unit to hold the work in correct position until punching operation is completed. This

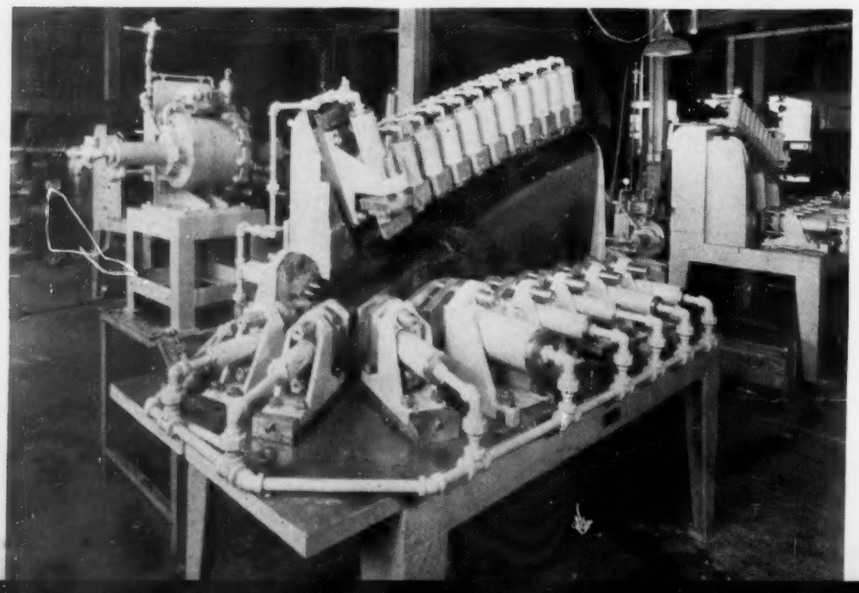


Fig. 1—Here 20 mechanical-stripping punch units punch a total of 36 holes in half a hood top. Push-button controlled, each fixture is operated by one man and produces 150 pieces per hour

ADVERTISING PAGES REMOVED

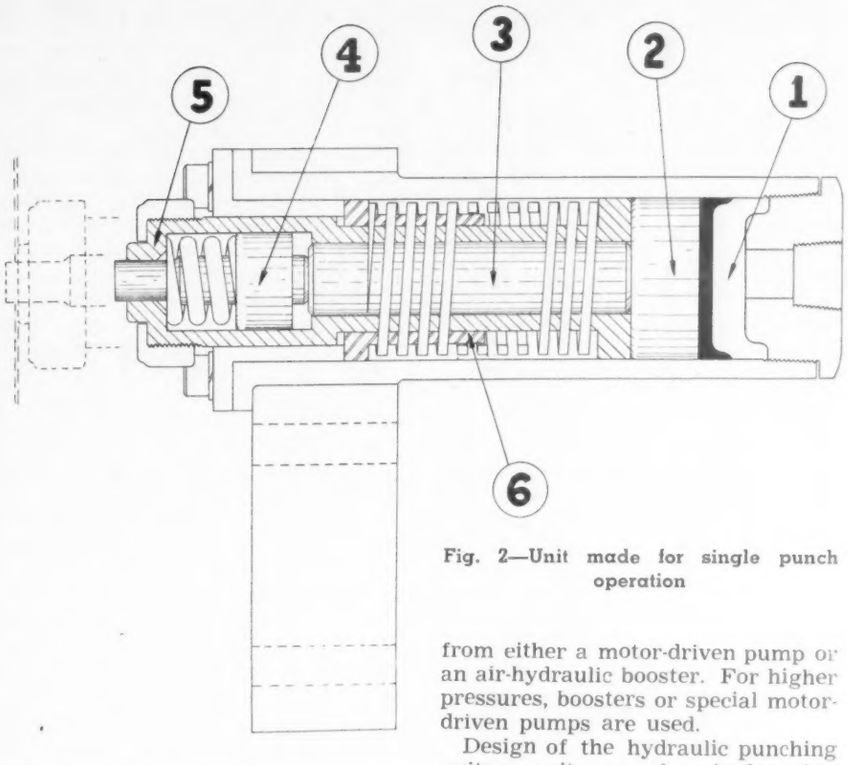


Fig. 2—Unit made for single punch operation

great flexibility permits one fixture using these units to supplant a number of individual press operations in many instances.

Another unique feature of the unit punching method is that the equipment has high salvage value since it is only necessary to relocate the units on the fixture or to assemble them on a new fixture to accommodate variations and revisions in models or to change from one job to another. The power plant, fluid reservoir and operating valve are standard and are 100 per cent readaptable to any fixture requiring hydraulic pressure. Other advantages said to accrue from use of these units are that setups are simplified and constant alignment is assured.

The entire fixture with its own power plant in most instances can be made of welded structural steel parts at a comparatively low cost. Also, being light in weight, the complete fixture can be moved easily from one location to another, which permits ready rearrangement of production lines to eliminate handling and rehandling of material between operations.

In addition to the use of these units in multiple in fixtures, they are well adapted for bench mounting for all types of light punching, embossing, notching and trimming operations. They also can be installed on the press, permitting a punching operation in conjunction with regular press operations. Units are made in two types, one for single punch operation, Fig. 2, and another for multiple operation, Fig. 3. Both standard types may be operated at pressures up to 2000 pounds per square inch from either a motor-driven pump or an air-hydraulic booster. For higher pressures, boosters or special motor-driven pumps are used.

Design of the hydraulic punching units permits use of a single-acting piston, eliminating trouble from packing glands and permitting greater bearing surface for the piston and rod. Also, it requires just half the amount of piping otherwise necessary and less complicated control mechanism. Close adjustment of the entire unit relation to the work is provided at the mounting bracket.

In the single punch unit, stripping is performed entirely through the action of balanced springs, this operation being automatic. The multiple punch unit is available either for hydraulic or mechanical stripping.

Operation of the smaller single-punch unit, Fig. 2, with booster is as follows: Air admitted at ordinary pressure on oil in reservoir moves both punch and stripping shoulder up to the work, at which point the resulting back pressure trips a switch admitting air to act on the pressure booster cylinder, thus creating the necessary high pressure required to drive the punch through the work.

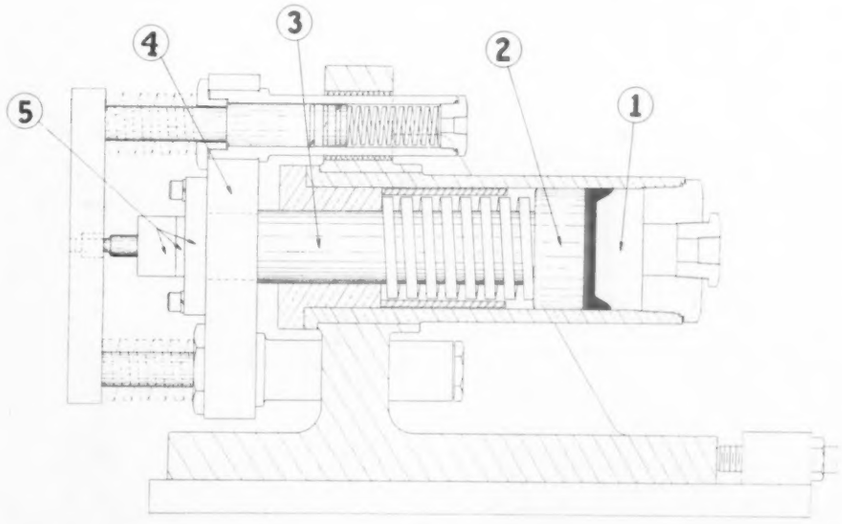
When pressure at pressure chamber, 1, Fig. 2, is relieved, punch is withdrawn by action of stripping spring shown coiled around the punch. This is the stronger of the two springs used and acts against both the punch retainer, 4, and the piston guide (shaded), the latter being held firmly in place until stripping is completed. When compression on the stripping spring approximates that of the piston spring, this latter moves the piston guide away from the work and to the starting position.

Sealed Against Oil Leaks

Adjustment of the retaining plate, 5, which can be moved through an arc of 25 degrees, positions any slotted or irregular-faced punches. A special hydraulic cup seals pressure chamber against oil leaks. Length of stroke is limited by steel sleeves, 6. A floating piston rod, 3, is provided between piston and punch.

Operation of the larger unit, Fig. 3, equipped for mechanical stripping is similar in principle to that of the smaller unit except that two stripping springs are used, contained in separate ground hollow guide pins. When stripping pistons finally bottom in their cylinders, the continuing retraction of the main piston moves the stripping plate away from the work. Also, stroke is limited by the steel sleeve. It should be noted for clear understanding of the operation that piston, 2, rod, 3, punch retainer, 5, and hollow stripping guide pins are integral as far as operation is concerned, the stripping guide pins being carried in large

Fig. 3—Similar unit made for multiple operation



bronze bushings to insure close alignment of punch.

Fig. 3 shows adjusting screw provided for positioning the entire unit. It also shows manner in which additional stripping springs (dotted) may be used for greater stripping power.

When hydraulic stripping is employed, a motor-driven pump is the usual power source. Pressure then is diverted from Chamber, 1, to the stripping guide pin. An oil-resisting cup seals the stripping chambers, although piston rings are optional. Also, rings are optional for the punch piston.

No Salvage Loss

A typical example of use of hydraulic punching units with mechanical stripping is shown in Fig. 1. Installed in an automobile plant, this fixture employs 20 mechanical-stripping punch units, used to punch a total of 36 holes in one half of a hood top. Four such fixtures are used for left and right hand hood top halves for both a 6 and 8-cylinder car. The use of individual units permits rearrangement to suit year to year changes in motor car design. This is done with practically no loss in the salvaging operation.

Each of the fixtures as shown in Fig. 1 is push-button controlled. Operated by one man, the average production is 150 pieces per hour per fixture.

Nash-Kelvinator Corp., Detroit, recently placed in operation a number of these hydraulic punch units assembled into a single punching and stripping fixture, Fig. 4, which punches a minimum of 22 and a maximum of 52 holes in transverse flanges of five different sizes of refrigerator door panels. This is done with just slight adjustment of the units.

Fixture employed for this work consists of 26 hydraulic punch units mounted on a machine steel base plate, Fig. 4. Each punch unit can readily be moved in or out according to the size of the door panels to be punched. The punches for the individual units are contained in quickly removable and interchangeable punch-holding plates and thus easily accommodate different panel sizes.

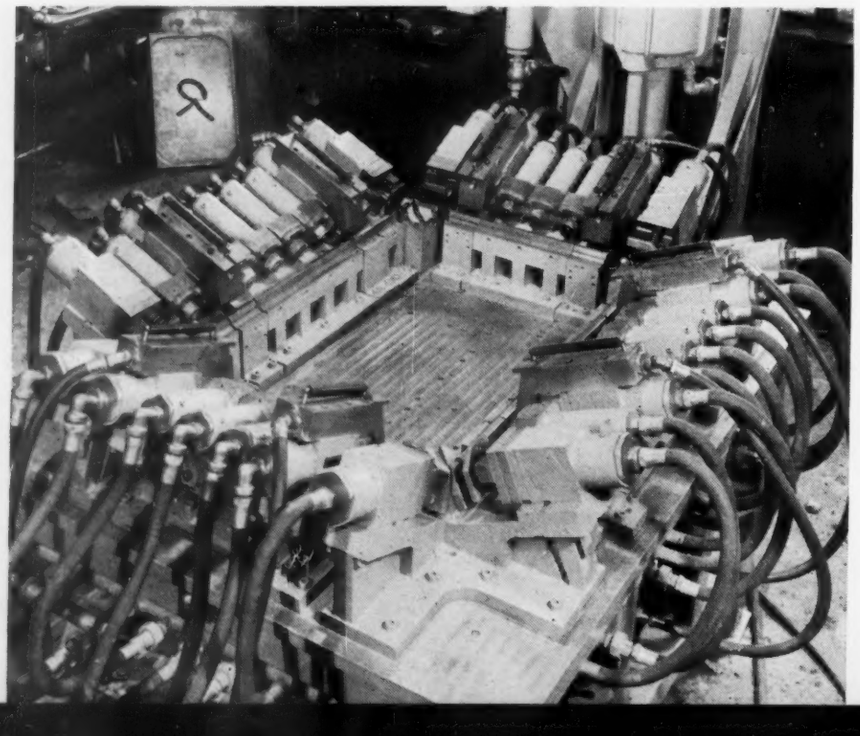
Eight hydraulically operated hold-down pads serve to position and secure the work.

A power booster supplies the necessary hydraulic pressure for the punching operation. This is applied simultaneously to any number of punching units producing up to a maximum of 52 holes at one operation. The hydraulic power booster operates from ordinary factory air line pressure of approximately 90 pounds per square inch.

On this application, stripping is mechanical and is controlled by differential spring action within the individual punching and stripping units as explained above.

The fixture is push-button operated and requires but two men for loading and operating the entire unit. Average production is 200 door panels per hour of any of the five sizes.

Fig. 4—This fixture with its closely spaced punch units makes from 22 to 52 holes in transverse flanges of five different sizes of Kelvinator refrigerator door panels



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Pyramidal-Diamond Tool Measures Indentations

■ A sensitive diamond indenting tool which gives indentations of accurately measurable length in the most resistant steels with loads of less than 1 kilogram has been developed by national bureau of standards, Washington. It was found that use of these light loads permits extension of indentation tests to small specimens and to tests of brittle materials.

The indenter is pyramidal in form and gives a diamond-shaped indentation of which the diagonals have ratio of about 7 to 1 instead of the 1 to 1 for the square-based pyramid.

Elastic recovery of indentations with this indenter takes place in a transverse rather than a longitudinal direction, and consequently, from the measured length of the long diagonal and the constants of the indenter, unrecovered dimensions of an indentation are obtained. Results of tests are expressed as indentation numbers which relate the applied load in kilograms to the unrecovered projected area in square millimeters.

Since both recovered and unrecovered dimensions may be obtained, the indenter is said to offer possibilities in the study of indentation testing that are not afforded by indenters which yield recovered dimensions only.

How Government Affects American Economic Life

■ *Government and Economic Life*, Vol. I, by Leverett S. Lyon, Myron W. Watkins and Victor Abramson; cloth, 519 pages, 6 x 9 inches; published by the Brookings Institution, Washington; supplied by STEEL, Cleveland, for $3.

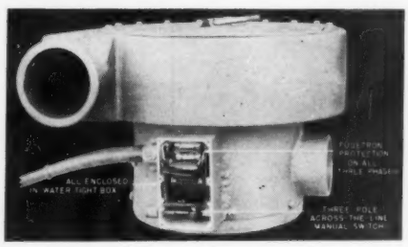
This is an interpretation of public economic policy in America, discussing trends and current issues in the light of economic forces and governmental actions which have influenced and conditioned them.

Among questions considered are the significant issues in present proposals to modify antitrust laws; current developments in determination of fair competition; today's issues relative to concerted labor action; amendments to patent laws; how development of monetary mechanism has tended toward management by government; to what extent in the United States governmental agencies are being used for new objectives and being judged by new criteria.

Instead of discussing the simplified issue of government control of business the authors have drawn a picture of the more fundamental issues of government's relation to economic life. The second volume of the study will go beyond the area usually referred to as government in relation to business and deal with those segments of economic life and those occasions in which government action has taken special forms or gone over into direct governmental production.

Pressure Blower

■ Sawyer Electrical Mfg. Co., 5715 East Leneve avenue, Los Angeles, announces the Master pressure blower for exhausting toxic fumes from welding operations where space is at a premium and an advantage lies in exhausting through a hose. Blower is said to be capable of moving a large quantity of air through hose up to 75 feet in length. Motor is entirely enclosed and is



placed in the intake air housing in such a way that entire volume of air delivered by blower passes around the motor with resultant efficiency in air cooling.

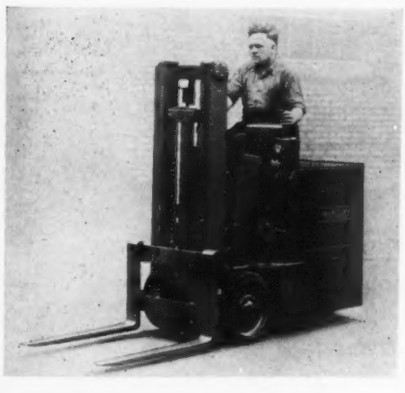
Blower is furnished with one, two or four inlet ports, with inside diameters dimensioned according to capacity of blower. Inlet ports are screened to prevent dust and dirt from affecting the impeller. Blower is 15 inches high, and entire unit can be passed through an opening 21 inches in diameter.

Capacity of the blower is said to be exceptionally high in proportion to size and power consumption. Tests show that 680 cubic feet of air can be handled per minute, with static pressure 3⅛ inches or higher, at 68 degrees Fahr. Air velocity is approximately a mile a minute.

Fork Truck

■ Mercury Mfg. Co., 4118 South Halstead street, Chicago, has put on the market its model A-1360 "sit-down" center-control fork truck, a compact vehicle having a capacity of 2000 pounds. Due to its light weight, truck is useful in multi-storied buildings where floor load limitations are in effect.

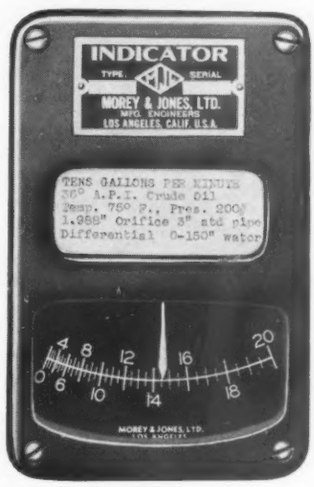
Driver is seated in a center-control position where he has good vision and is protected. Truck is available with or without tilting feature which provides 3 degrees forward tilt and 10 degrees backward tilt and is furnished with either high or telescopic lift. High-lift truck elevates to 63 inches and telescopic elevation is 115 inches. Collapsed height is 83 inches.



Hoist and tilt systems are Mercury hydraulic type. Travel control is mechanical contactor type with three speeds in either direction. Drive axle has double-reduction spiral-bevel and spur gears with full floating-drive shafts and Timken bearing mounted wheels.

Rate of Flow Indicator

■ The MJL No. 98 rate of flow indicator announced by Morey & Jones, Ltd., 922 South Hemlock street, Los Angeles, indicates rate of flow of liquids, steam and gases in all process industries, balances flows in refineries and absorption



plants, indicates rate of flow of cooling water and lubricating oils to bearings in prime-movers, etc.

Indicator does not have to be accurately leveled and may be transported in any position without locking any parts in place. Due to the unique principle involved, the instrument may be calibrated for any differential pressure range between 0-30 inches and 0-225 inches of water. Permanent calibration is assured by rigid material specifications and by working the spring well within its elastic limit. Either high or low-alarm contacts or both may be supplied to operate a signaling device when the flow or liquid level reaches any predetermined point.

Chime Transformers

■ Jefferson Electric Co., Bellwood, Ill., announces a new series of chime transformers with 12 and 18-volt secondaries for connection to 115-volt circuits. Types are furnished with secondary lead wires or binding posts according to the job.

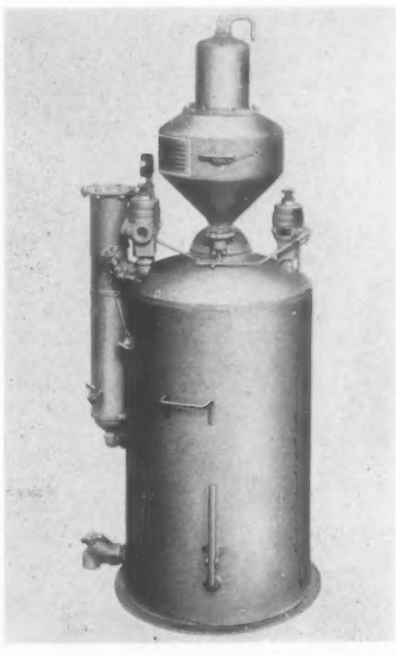
Intermittent duty rating is 15 volt-amperes. Transformers are furnished with standard mounting feet or are mounted on round or square outlet box covers.

Acetylene Generator

■ The Linde Air Products Co., 205 East Forty-second street, New York, announces Oxweld MP-9 medium-pressure acetylene generator which holds 25 pounds of size 14 ND Union Carbide and will deliver 50 cubic feet of acetylene per hour at any pressure up to 15 pounds per square inch. Several hours of continuous welding or cutting on all except the heaviest work can be obtained from one charging.

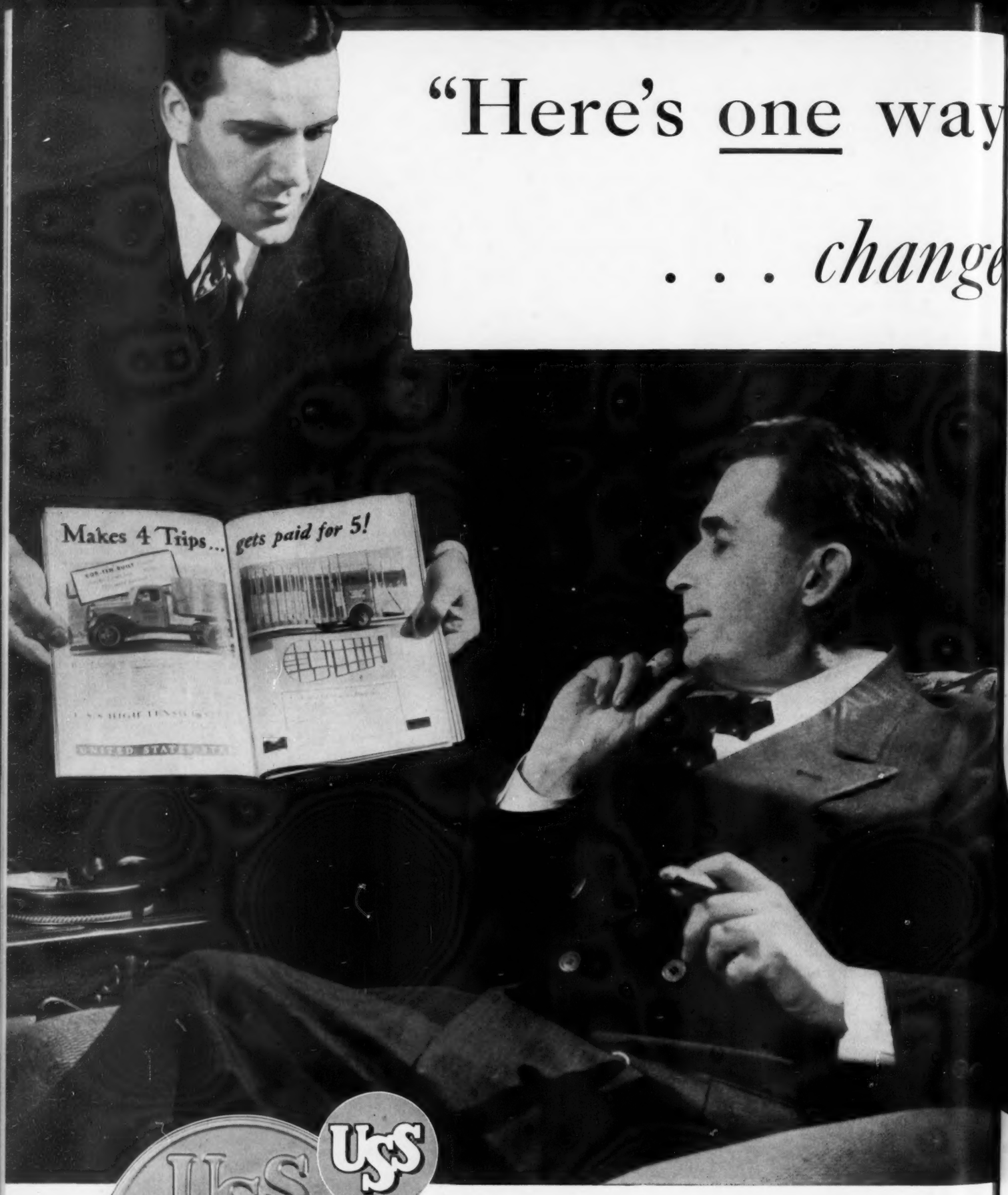
A smooth flow of clean, dry acetylene is produced with no appreciable variations in pressure, thus facilitating maintenance of stable blowpipe flame. One handle starts and stops generation of the acetylene and adjusts delivery pressure. After starting, operation is fully automatic.

Generator is constructed of steel-welded steel parts and is mounted



"Here's one way

. . . change



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Then the transit industry discovered U·S·S COR-TEN. Streamlined street cars built with U·S·S COR-TEN were seven tons lighter, faster, easier riding—and fare boxes began to jingle again. COR-TEN-built buses weighed less, were speedier and cost less to operate—won thousands of new riders.

Adopted for trucks, and truck trailers U·S·S COR-TEN converted parasite pounds into extra hauling capacity or extra strength.

Today, in mobile equipment of every description, you'll find U·S·S COR-TEN *and other U·S·S High Tensile Steels reducing weight safely and with the* least *increase in cost.*

U·S·S COR-TEN, the *pioneer* low-alloy, high tensile steel has a yield point of 50,000 lb. per sq. in. Its modulus of elasticity — resistance to bending—is almost three times that of non-ferrous "light" metals. Its resistance to corrosion is 4 to 6 times that of plain steel. Its durability is in equal ratio. That is why stress-carrying members of U·S·S COR-TEN do not have to be thick to be strong, stiff and durable.

Nor do they have to be costly. Because U·S·S COR-TEN is a low-alloy steel its price is low—only slightly more than ordinary copper steel. It fabricates easily, at shop costs comparable to plain steel. That's why U·S·S COR-TEN construction makes it unnecessary to pay a high premium for saving weight . . .gives the user of COR-TEN equipment the greatest margin between costs and savings.

We'll be glad to show you how to apply this TESTED, high-strength steel to your designs, most economically.

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AMERICAN STEEL & WIRE COMPANY, *Cleveland, Chicago and New York*
CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
COLUMBIA STEEL COMPANY, *San Francisco*
NATIONAL TUBE COMPANY, *Pittsburgh*
TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham*

Scully Steel Products Company, Chicago, *Warehouse Distributors* · United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL

on any of three trucks. Model TS truck, recommended for use on fairly even floor, and furnished unless other type specified has swivel casters for easy moving in small space. Model PRT truck is easiest to move, having ball bearing wheels, and is recommended for industrial plants. For use on ground or very uneven floor, model TR truck with rigid wheels front and rear is recommended. Weight is 129 pounds.

Direct-Drive Sprayer

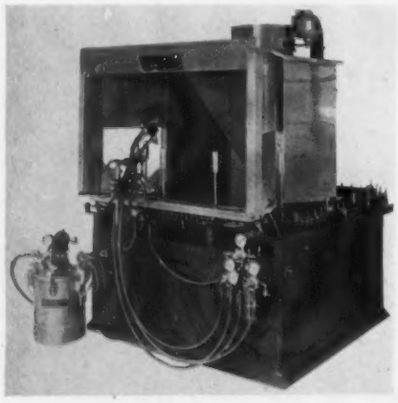
■ DeVilbiss Co., Toledo, O., offers its new Type NCK direct-drive spray painting outfit with maximum working pressure of 40 pounds. Compressor, mounted on rubber-footed metal base, is of single-cylinder, ball-bearing type directly connected with 1/3-horsepower motor and has 2-inch bore, 1½-inch stroke

and displacement of 4.58 cubic feet per minute.

Fan type counterbalanced flywheel reduces vibration to a minimum and assures proper cooling. Finned air chamber relieves pulsation and serves as oil and moisture separator. Safety valve, drain valve, connection for hose, switch at motor, attachment plug and 12-foot length of electric cord are provided.

Spindle Spraying Machine

■ A new standard spindletype automatic spraying machine offered by Binks Mfg. Co., 3114 Carroll avenue, Chicago, is adaptable to all types of automatic spray finishing for clocks, battery boxes, golf balls,



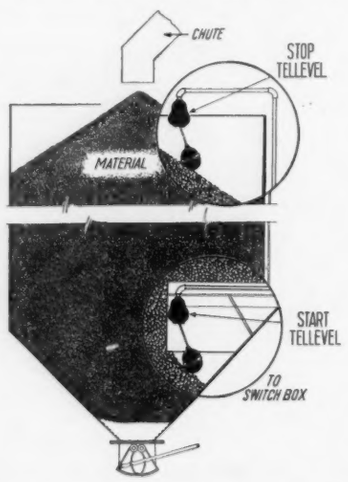
insulators, lamp fixtures, etc. It utilizes the new Binks Thor model No. 21 automatic spray gun connected with a 3-way valve that turns the gun on and off so gun sprays only when it is following the revolving products to be finished. Either dry or water wash type spray booth is available.

Bin Storage Control

■ The Tellevel, announced by Stephens-Adamson Mfg. Co., Aurora, Ill., is a control for starting and stopping conveyors feeding bulk materials to bins or hoppers and for opening and closing valves feeding liquids into tanks. Operation is normally entirely automatic, but by a simple change in wiring the device can be made to keep the flow of material stopped or continuous until the control switch is thrown.

This dust-tight, explosion-proof Tellevel consists of a multiple electrode sealed mercury switch so mounted that tipping it in any direction will break the electric current. A polished aluminum bell provides the dust-tight housing for the switch and electric wiring.

Mounting for the mercury switch is a fiber holder screwed to the top of the tipping rod. Rod is pivoted in a rubber diaphragm, its lower end fitting into the globular polished aluminum bell. Bell housing is supported on the end of a ½-inch con-

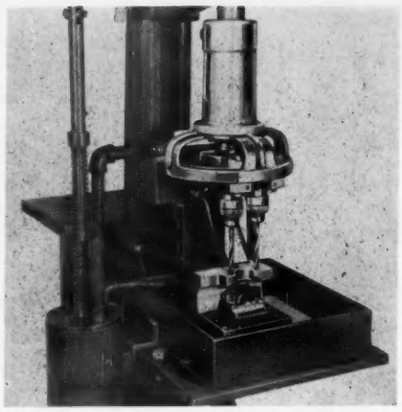


duit pipe. With double arrangement illustrated, when bin has been filled, upper or stop Tellevel shuts off feed of incoming material from conveyor. As level of material in bin falls below the lower or start Tellevel, the start Tellevel straightens itself, starting conveyor feeding material into bin.

The Tellevel sells for $25.

Adjustable Drill Head

■ A newly patented, 2-spindle, quick-set, adjustable drill head is announced by Linderme Machine & Tool Co., 12261 Coyle avenue, Detroit. Adjustment to desired drill



centers (⅞ to 6 inches) may be made by turning two hex nuts, which when tightened will not slip or shift. Drill sizes of 0 to ½-inch are recommended.

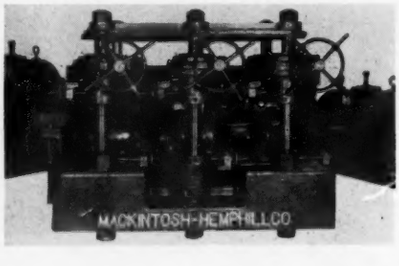
Heads are suitable for small drill presses such as light type Canedy Otto and Demco No. 15. They are also adaptable to larger presses, and can be used for tapping operations.

Air-Cleaner

■ A new line of improved "Precipitron" electrostatic air-cleaning equipment for commercial and industrial use is announced by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Two sizes of cells have been adopted as standard: a cell with an 8 x 18-inch effective cross section and a cleaning capacity of 375 cubic feet of air per minute; and an 8 x 36-inch cell with a capacity twice as great. From these two standard units, an air-cleaning system for any given physical layout may be constructed quickly and economically. Larger cell has an efficiency of 90 per cent at 600 cubic feet of air per minute and 85 per cent at 750 cubic feet per minute; the smaller cell is 90 per cent efficient at 300 cubic feet per minute or 85 per cent at 375 cubic feet per minute.

Bar, Tube Straightener

■ Mackintosh-Hemphill Co., 901 Bingham street, Pittsburgh, has developed a straightening machine employing an entirely new principle of straightening for rounds, pipe and tubes claimed to result in better straightening affect, greater roll life, elimination of end bends and guides scoring the stock, less power consumed and greater speed of pro-



duction. Straighteners are designed for maximum accessibility and speed of roll changes. Machines are built to handle all sizes of bars and pipes, and also to produce accurate rounds within exacting requirements.

Gravity Feed Oiler

■ A new line of visible gravity feed oilers with unbreakable reservoirs is announced by Trico Fuse Mfg. Co., 2948 North Fifth street, Milwaukee. Oiler illustrated is mounted at top of part to be lubricated. By a simple adjustment of the ratchet control, any predetermined number of drops of oil per minute can be obtained, after which it is necessary only to keep a reserve supply of oil in the bottle. Shut-off lever at top, when in a vertical position as shown, feeds oil; and when tilted to the side, stops the flow.

Oiler is 50 per cent lighter in weight and has no gaskets as bottle is cemented and roll-clinched to the heavy brass base. All metal parts are bright cadmium-plated. A heavy tension ring fits over dual ratchet springs to assure uniform pressure on ratchet feed, and it is claimed extreme vibration or careless handling cannot change the adjustment.

Grinding-Wheel Bushing

■ The V. D. B. vibration dampener bushing resilient mounting for portable grinders is a new feature being incorporated in grinding wheels manufactured by Manhattan Rubber Mfg. division, Passaic, N. J. Use of this mounting requires no changes in existing equipment and increases grinding wheel life. Machine maintenance costs are said to be reduced and an improved finish obtained.

Hardness Tester

■ A new type hardness tester with automatic features for volume testing and known as the "Steeltest" is being put on the market by Modern Collet & Machine Co., Ecorse, Mich. There are no charts and no comparative readings. Standard 100-division dial gives actual hardness numbers in Rockwell and brinell. Indicating dial is mounted flush with instrument and out of the feeding zone. It has one large black indicator and two red tolerance hands which are adjustable to the required limits.

The only manual operation required is the hand elevation by a removable crank for the initial setting of specimen. Travel of the penetrator is fully automatic and is synchronized with two flasher lights located directly below the indicating dial. The green flasher-light signals the time to feed and the red light indicates setting is within the range of penetrator travel. When the specimen is being tested improperly or instrument is running idle, the red signal is given.

Welding Positioner

■ Model 60 C-F welding positioner of Cullen-Friestedt Co., 1300 South Kilbourn avenue, Chicago, has a capacity of 6000 pounds when center of gravity of load is 12 inches from face of table and 6 inches to side of axis of rotation. Table can be rotated through a full circle regardless of angle at which it is

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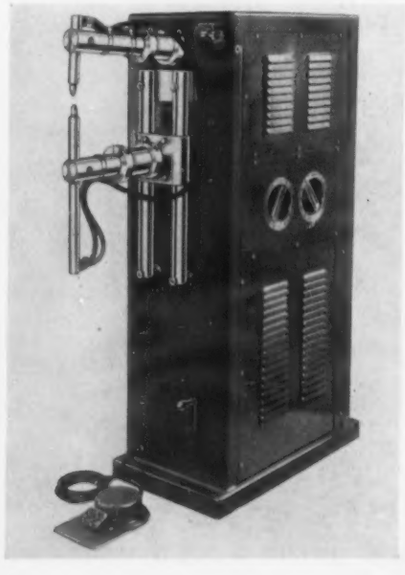
tilted, and can be tilted through an arc of 135 degrees from horizontal position. Gears for rotating and tipping table are self-locking in all positions. Rotating and tilting movements are each controlled by independent motors and controls.

Height of table is adjustable from 42 to 54 inches on machines with standard bases. Positioner can be furnished with a special mounting for handling extremely large work. Table can be removed so special fixtures or jigs can be mounted directly on positioner.

All surfaces of work can be maneuvered for positioned welds except portion in contact with table. All mechanism of positioner is below table and does not interfere with work, regardless of position of the table.

Spot Welder

■ Pier Equipment Mfg. Co., Benton Harbor, Mich., has added two new models to its line of Ace spot welders used for spot or projection welding, and, with suitable fixtures, for butt welding. They are both 50-kilowatt size, one motor-driven automatically operated is illustrated

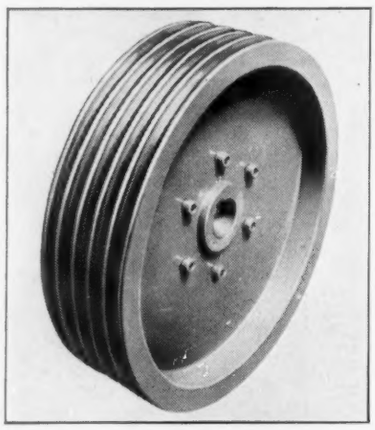


here, and one is manually operated by means of a new swivel-jointed foot treadle. Both have added refinements such as new recessed automatic trip control and timing adjustment.

An 8-point heat regulating switch for adjusting secondary voltages and current is furnished on these models. Four throat depths are available and lower horn may be adjusted to provide spacing up to 15 inches on standard welders. Transformers are designed regularly for operation on 220-volt, 60-cycle supply.

Demountable Rim Sheave

■ Allis-Chalmers Mfg. Co., 1126 South Seventieth street, Milwaukee, has extended its line of Texrope demountable rim type sheaves to cer-



tain sizes carried in stock and a range of sizes which can be made promptly to order.

These cast-iron sheaves have been designed for installations requiring occasional speed changes, and all consist of a substantial bushing on which may be mounted a sheave rim of desired number of grooves and pitch diameter. Rim is fastened to hub by six cap screws so sheaves can be changed without removing hub from shaft.

Cutter and Tool Grinder

■ A new No. 2 cutter and tool grinder of wheelside type having cartridge-type ball-bearing wheel spindle is announced by Norton Co., Worcester, Mass. Antifriction table runs on balls held in a chainlike container. Hardened steel ways are used and adjustable breaking device permits creating a "drag" on the table or locking it securely in some specific position.

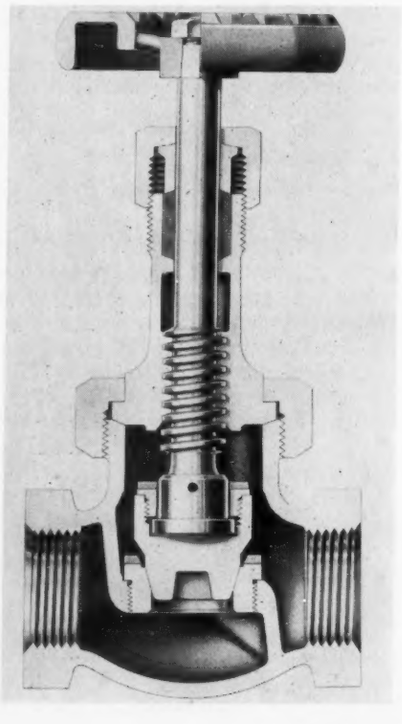
Machine is available either as plain cutter grinder or as universal machine, the only difference being that more equipment is supplied with universal model. Supplied with both are reducing collets for No. 12, 10, 9 and 7 B & S tapers. Both universal work head and left-hand foot-

stock are provided with clearance angle setting dials. Universal model includes attachments for internal, surface, cylindrical and gear cutter grinding.

Globe and Angle Valves

■ Kennedy Valve Mfg. Co., Elmira, N. Y., announces a new line of bronze globe and angle valves with plug-type discs and renewable seat rings for close control in throttling service and for general heavy duty. Valves are made in sizes from ¼ to 2 inches for 200-pound steam at 550 degrees Fahr. and 400-pound cold water, oil or gas, nonshock; and in sizes from ¼ to 3 inches for 300-pound steam at 550 degrees Fahr. and 600-pound cold water, oil or gas, nonshock. Plug-type disk and renewable seat ring are both of copper-nickel alloy, seat rings being of a harder composition than the disk.

The angularity and length of disk and seat ring have been proportioned to minimize wear at small



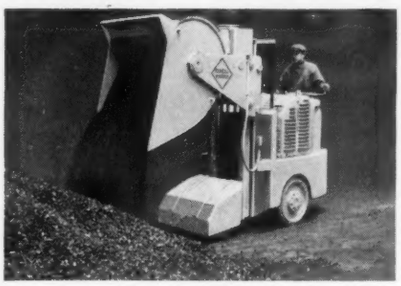
ADVERTISING PAGES REMOVED

openings and to permit tight closure even if faces are partially damaged in service. Each seat ring is matched to its companion disk to assure full bearing surface over entire contact area of each. Bonnets are provided with particularly heavy union bonnet rings, and have machined seat on under surface to permit repacking under full line pressure when the valve is wide open.

Power Industrial Truck

■ Elwell-Parker Electric Co., 4205 St. Clair avenue, Cleveland, announces a power industrial truck with a scoop of ½ to 1 yard capacity capable of being rotated more than 100 degrees and having power mechanism for elevating and lowering the load. Design is streamlined and all vital parts are housed.

Power plant is optional electric



or gas-electric, and operating power is furnished through three separate standardized motors. Motors, gear reductions and controllers are built completely in the Elwell-Parker plant. The motors respectively propel the truck, elevate and lower the scoop and load and operate the crowding and rotating mechanism of the scoop. A separate limiting device controls the motor which elevates and lowers the load by means of high-safety factor, double-roller chains.

All motors have slip clutches and limit switches to protect mechanical operating mechanism and eliminate fuses in power lines. Dynamic electric brakes supplement mechanical foot brakes for operation on ramps. Regenerative load-lowering mechanism returns power to battery.

Scoop, which undercuts pile, loads itself by impact and by crowding and rotary motion.

Drawing Machine

■ Autodraft portable drawing machine, manufactured by Eugene Dietzgen Co., 2425 Sheffield avenue, Chicago, provides a drawing board, T-square, triangle, scale, protractor and paper clamps all in one, although it is no bigger than a brief case and as easy to carry. The L-square protractor mechanism is held in true by a permanently attached semiuniversal arm which swings over entire board. Protractor-L-square may be set at any

angle instantly by loosening knob. Angles from 0 to 360 degrees are available. Legs of L-square are graduated in inches and may be used with detachable extension scale. Entire mechanism is non-reflecting metal. Drawing board is light-weight Preswood in 2 sizes: 9 x 12 and 12 x 18 inches.

Excavator

■ Thew Shovel Co., Lorain, O., announces a new 1¾-yard excavator, the Lorain-80, with complete line of interchangeable boom equipment such as shovel, dragline, crane, clamshell and backdigger. Turntable is of Thew center drive design and can concentrate power entirely on one operation or spread it over two or three simultaneous and synchronized operations.

Crawler base is a center "chain" drive crawler, 14 feet 1 inch long and 10 feet 10 inches wide. It has 28-inch treads, and 34-inch treads are also available. Crawler has two travel speeds—1½ and ¾-mile per hour. It can be steered in either direction at either speed. Ratchet

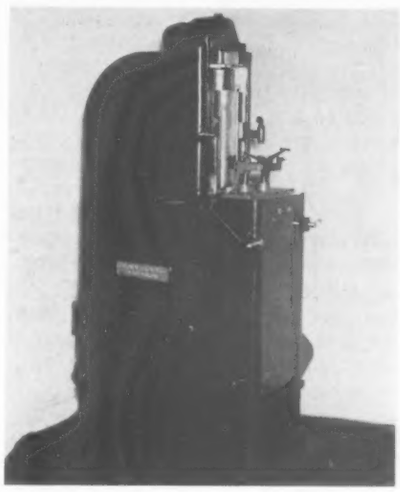
and double pawl provide travel and safety lock.

Effective length of all-welded steel shovel boom is 24 feet 8 inches, and it has an 18-foot all-welded rectangular steel dipper stick equipped with spring-mounted greenhorn cap to eliminate impact shocks. Shipper shaft is at center of boom and shipper shaft barrel which guides dipper stick is lined at both ends with equalized and adjustable guides.

Two long-range stripping shovel booms are available: one has a 25-foot boom, 25-foot stick and 1½-yard dipper; the other has a 30-foot 6-inch boom, 25-foot stick and 1¼-yard dipper.

Pull-Down Broach

■ A pull-down type broaching machine rated at 4 tons said to provide extreme simplicity of loading and unloading and to eliminate both manual and automatic broach handling for internal broaching has been developed by Colonial Broach Co., 147 Jos. Campau street, Detroit. This machine broaches key-ways in taper holes of steering wheel hubs, two hubs being broached at one time. Broach is pulled down through work and



when bottom of stroke is reached, ram trips a release which causes work-holding cradle to lift up under spring pressure at an angle away from broach.

With broach at top, work-holding cradle is lowered manually against spring pressure, locating parts over key-way horn which also serves as guide for broach. Cradle is automatically locked in this position when lowered and remains there until released again at end of next workstroke. To start broach down on cutting stroke, operator must place both hands on dual safety controls.

Standard stroke of machine is 24 inches, but stroke is adjustable by means of trip dogs mounted in T-slot in right-hand front face of machine. Machine has cutting speed of 30 feet per minute on down stroke and high-speed return of 60 feet per minute. Main drive motor is built into frame for streamlined compactness.

Welded Railway Trestle

(*Concluded from Page 58*)

eral bow was removed by blocking and pulling with a hoist. The laterals then were applied, pulled up tight in position with a crane and tack welded. Tie facing was made standard, throwing the odd spacing at the end. Angle tie spacers were set in slots in a templet and tack welded. All joints then were completely welded. When finished, bearings of girders were checked with a straight edge and ground to suit.

Cross welding on members to carry tension was avoided. Stiffeners in contact with chord members to take tension were welded to a diamond shaped filler plate instead of directly to the flanges. This filler plate then was welded to inside of flange.

The longer spans had the beams cambered at the mill. While welding of spacers on top flange of spans had a tendency to shrink the top flange, care was exercised in welding, so loss in camber in the 80-foot spans was only about ½-inch.

Studies Potential Value of Alloys Made with Electrolytic Manganese

■ A PROGRESS report prepared by the metallurgical division, bureau of mines, and issued in November by the United States department of the interior, Washington, deals with "Manganese and Its Alloys." The foreword states that "in the development of new metallurgical processes to the point where private interests are willing to make a real effort to determine their practicability, it has been found necessary to demonstrate rather definite outlets for the products of such processes.

"A good example is furnished by the process developed in the metallurgical division for the production of electrolytic manganese. A rather comprehensive program of alloy investigation has been initiated and this report contains the results of studies which point out the potential value of various manganese alloys."

The 48-page report, containing many tables, 32 illustrations and 127 reference footnotes, was prepared by R. S. Dean, chief engineer, C. Travis Anderson, associate physical chemist, Cresap Moss, assistant metallurgist, and P. M. Ambrose, assistant metallurgist, respectively, of the bureau's metallurgical division.

The authors describe a few of the alloys that can be made from electrolytic manganese and should form the basis for an important place for manganese in the alloy industry. Engineering data on the alloys was not given because, to be indicative of practical usefulness, they must await larger-scale manufacture.

In its summary, the report states that the problems involved in establishing the production of electrolytic manganese on a commercial scale have been solved at least to the extent of permitting some commercial production. Further development of the art should make electrolytic manganese a commercial article in the near future.

Attention was called especially to classes of manganese alloys that seem certain to find industrial use, as follows:

1. Alloys with combination of high strength and high vibration-damping capacity at low stress. Such alloys will provide the designing engineer with a new combination of properties from which to design machine elements to vibratory stresses.

2. The stainless hardenable alloys of the iron-chromium-manganese group. These alloys should find use in bearings and tools.

3. The alloys of the copper-zinc-manganese and copper-nickel-manganese series, having many properties of brass and nickel silver.

4. The alloys containing approximately 65 per cent zinc, 20 per cent manganese, and 15 per cent copper, which give strong, tough castings.

5. The alloys of manganese with aluminum, which appear to be far more useful when made with electrolytic manganese.

Work now under way covers the systems discussed more fully, as well as other systems that promise to have different properties when made with electrolytic manganese.

New Wire Plant

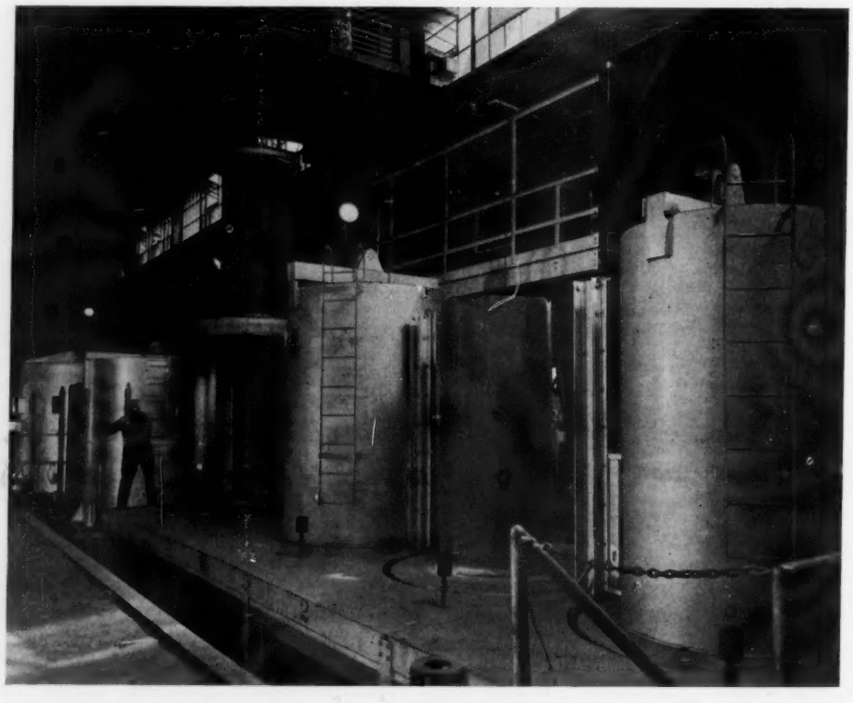
(*Concluded from Page 45*)

when handling heavy coiled stock. As previously noted, stock is brought from the rod mill rod mill on a continuous hook-type conveyor. From the point of entry to the wire department it is handled on ram or trailertrucks, depending on size of the coils and transfer required. Considerable use of light electric hoists mounted on overhead tracks also is made. The L-type, or gantry, crane in the cleaning department is an example of the well-planned handling found all over this plant.

A shipping room 80 by 400 feet, adjoins both the new and old mills. A 10 car railroad siding runs into this room so finished wire may be trucked directly into cars.

Incidentally, considerable use is made of refrigerator cars in shipping wire to customers. Their use prevents rapid changes in temperature of wire and possible spoilage of bright-finished material.

Fig. 4—New bell-type bright-annealing furnaces replace pot type formerly used



Shuttle Belt Conveyor

(*Concluded from Page 42*)

tions of gates and conveyors are also shown in Fig. 2.

At the bow end of the ship these hold conveyors transfer the coal onto short transverse belt conveyors going to receiving end of a large chain and bucket elevator running through the deck and delivering to the lower end of the boom belt conveyor and the transverse shuttle conveyor. The boom conveyor is 54 inches wide and 162 feet long and capable of handling up to 1500 tons of coal an hour. This boom with its belt conveyor is similar to many now in such service and may be raised, lowered, or swung out on either side of the boat for unloading into hoppers, railway cars, or ground storage piles.

The shuttle conveyor, installed crosswise ship at deck level near discharge end of chain and bucket elevator. Coal hence can be loaded on the shuttle conveyor with same ease as on boom conveyor. The shuttle conveyor is so named because it can be extended over either side of the ship.

End of shuttle conveyor is hinged at a point 20 feet from each end so it may be raised or lowered on either side by a local electric motor hoist to suit height of barge walls or depth of receiving hold. Each end of the shuttle also is provided with a flexible collapsible chute to guide discharge, and reduce free dropping height. Being fully enclosed it also prevents coal dust from blowing away while dropping.

Metal Composition for Electrical Contacts

■ A powdered metal composition known as Gibsiloy placed on the market by Gibson Electric Co., 555 Allies boulevard, Pittsburgh, is claimed to make electrical contacts possessing the high conductivity and the low-constant resistance of pure silver.

It is claimed that because of its ductility, Gibsiloy can be formed into a wider variety of shapes than similar materials which, owing to their brittleness, must be cast to form. This metal can be punched. machined, drilled, tapped and otherwise worked as easily as ordinary alloys.

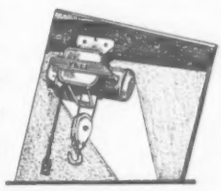
Contacts of this material are much harder than contacts made of pure silver and resist wear to a greater degree. Hardnesses range from that of pure silver to 200 brinell B scale Shore scleroscope for some grades of silver-nickel-tungsten.

Introduced by Yale just a short time ago, the Cable King with its AIR-COOLING feature is already skyrocketing its way to leadership in the electric hoist field. NOW everybody wants AIR-COOLING!

The reason is simple. AIR-COOLING saves the operator money. The basic limiting factor in electric hoist construction has always been excess brake heat. When Yale engineers adapted the special sirocco blower action that would cool the brake frictional parts they, *for the first time,* made it possible to eliminate this heat.

That's the principle of AIR-COOLING—a principle that permits *the Cable King to operate on a heavier duty cycle than any other hoist in the same class.* And that means *greater economy than any other hoist in the same class!*

In addition, the precision construction of the Cable King makes it the closest approach to perfect engineering specifications that has ever been built. AIR-COOLING plus mechanical perfection—that's what you get in the Cable King. It's the very latest advance in hoisting equipment. Contact your local distributor or send direct for free catalogue.



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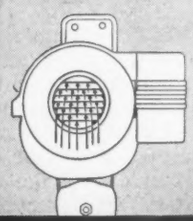
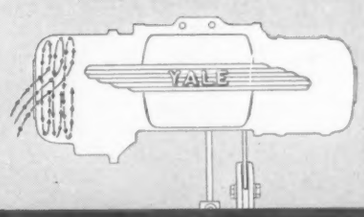


The Greatest Economy Factor Ever Developed in Electric Hoist Construction.



YALE

THE YALE & TOWNE MFG. CO.
PHILADELPHIA DIVISION, PHILADELPHIA, PA., U. S. A.
IN CANADA: ST. CATHARINES, ONT.

Training of Young Engineers Is The Responsibility of Industry

(*Continued from Page 27*)

production methods, and (c) adequate financial remuneration during training periods, with ample rewards for accomplishments in invention and production.

"Mechanical engineering as a profession," he said, "depends upon experience, in the design, application, and use of machines, and the direction of men in industry. The more thorough the graduate's knowledge of every phase of the business and its machinery the more competent he will become in later years. Too often there is a tendency to shorten the time spent in the shop or over a drawing board. This is a mistake that needs correction.

"Our industries should not have to depend on foreign sources for designers and draftsmen. Even if some other branches follow later, experience in design enables an engineer to present his idea effectively and to appraise the drawings of others. Also, experience with production machinery is an invaluable asset later to an executive of an industry."

Prof. Christie pointed out that the present curricula of engineering schools devote much time to fundamentals, as embodied in mathematics and the sciences, and to cultural subjects. There are fewer specialized courses than was the case 30 years ago. Today colleges merely prepare men to enter training in the practice of engineering.

Must Have Special Training

"Specialized training in engineering subjects beyond that of the 4-year course, is needed by college graduates taking jobs under present-day conditions," he emphasized. "The responsibility for such training rests squarely with industry."

Professor Christie said that several plans for such training already exist, but that the problem in general has not been satisfactorily solved and that much remains to be done. He believed that some accrediting agency, such as the Engineers Council for Professional Development, should be assigned to the job of developing a comprehensive plan.

Direct rolling of light, flat steel commercially in the not too distant future was indicated by C. W. Hazelett, president, Hazelett Metals Inc., New York, in discussing the process of this type which he has developed and which now is in successful commercial operation on brass and other nonferrous strip products. Much yet remains to be done, but definite progress has been made, he said.

Speaking with particular reference to his latest improved type of mill for the direct rolling of molten metal, he said that most efforts so far have been confined to brass, but that sample heats of copper, aluminum, low carbon steel and silicon steel had been rolled with as good results as with brass at the time they were rolled. Further work in this direction is being done.

By aid of color motion pictures, he traced the more recent developments of his process, and outlined principal difficulties, which include notably segregation, inability to get thin gages due to the increasing effect of folding as soon as strip was manufactured, need for higher speeds and lower roll or cooling surface cost per ton, particularly with steel, monel metal and nickel.

Roll Cost Insignificant

The new mill has gone far in solving these problems. Segregation in brass has been eliminated and gages as low as 0.015-inch can be turned out in one operation. Strip can be rolled at 500 feet per minute (and much higher if necessary), with sufficiently good gages for re-rolling. Further, Mr. Hazelett said, roll cost per ton has become an insignificant factor. Much work remains to be done on the heavier gages and on all sorts of other metals and alloys.

A comprehensive discussion of considerations in the design of forged steel rolls was presented by J. R. Adams and H. L. Watson, superintendent and assistant superintendent, respectively, special products division, Midvale Co., Philadelphia. Attention was directed to the influence of stress concentration at the junction of the journal and roll body and to the effect of the bores upon the stresses in forged steel rolls. Different types of drives, centers, and preparation of the ends of the bores for the attachment of cooling equipment also were discussed.

Asserting that economic problems created by technological progress has resulted in recurrent maladjustments sufficient to jeopardize free private industry, Andrew I. Peterson, assistant professor of engineering economics, college of engineering, New York university, New York, emphasized the burden thus placed upon management and the importance of engineering to management.

"Many engineers," he said, "unfortunately have concerned themselves with the technique of their specialties, allowing their responsibilities to management to be those of technicians and clerks. Truly, professional management in modern industry demands competence and vital direction of a high order, approached only with scientific objectivity."

He spoke of engineering and economics as the basic tools of the managerial profession and said that the problems inherent in the applied economics could be reduced to four types—"the selection, replacement, and apportionment of elements of production; the analysis of optimum enterprise economy; the rationalization of the dynamics of specific industries; and the interpretation and guidance of the trends and adjustments in the parent environment."

He pointed to the necessity of more critical research and broader training in industrial management, asserting that the responsibility for this development lies with the engineering schools, industry and the professional societies.

W. A. Shewhart, fundamental quality engineer, Bell Telephone Laboratories Inc., New York, contributed to the session on managerial problems a paper "Statistics Applied to Mass Production." He believed that the application of statistical theory in the control of the quality of the manufactured product is of interest not only because of its economic significance in that field, but also because it represents the simplest form of scientific control. Recent studies in this field, he said, have thrown considerable light on its importance.

Statistics Used More Widely

Many business managers are making intelligent use of statistics in arriving at policy decisions, according to Kenneth H. Condit, executive assistant to the president, National Industrial Conference board, New York. He provided illustrations to show the various types of statistical material available for this purpose, with some reference also made to the methods employed in securing them.

Results of an investigation into the distribution of load on the threads of screws and types of deformation affecting it were discussed by J. N. Goodier, professor of mechanics, Cornell university, Ithaca, N. Y. Extensometer measurements were made on the outside of the bolt, with types of deformation, characteristic of concentrations of load on different parts of the thread, found by using a bolt carrying only a single turn of thread.

At low loads, the speaker said, the deformation of nuts with complete bolts closely resemble the effects of

the artificial concentration of load on the base part of the thread, whereas there are marked contrasts with the effects of loads concentrated at the middle or at the free end. At higher loads, a more uniform distribution is indicated. Similar conclusions follow from the application of an approximate method for deducing the distribution from the deformation measurements, it was stated.

Distribution, Prof. Goodier said, is governed by (a) stretch and compression in bolt and nut, respectively, which are primarily responsible for concentration at the base; and (b) by bending of the thread, circumferential stretch (at the base), and contraction (near the free end) of the nut wall, which have comparable effects in reducing the concentration.

Stresses in Pipe Bends

In their paper, H. Poritsky and H. D. Snively, engineering general department, General Electric Co., Schenectady, N. Y., called attention to an analogy which they believed should be of considerable assistance in simplifying calculations of stresses and deflections of three-dimensional pipe bends by pointing out their similarity to familiar dynamical concepts involving products and moments of inertia and moments of momentum.

New technique in time and motion measurement was demonstrated by David B. Porter, associate professor, industrial engineering, New York university, New York. Comparisons were made between employing the "Marsto-Chron" and the stop-watch, with the use of the former emphasized for measuring short-cycle times and for building standard data. Also demonstrated was an improved projector for micro-motion analysis and a new counter for recording time on motion picture film.

Importance of designing machine tools with a greater view of enhancing the efficiency of the operators was stressed by O. W. Habel and G. G. Kearful, Saginaw Steering Gear division, General Motors Corp., Saginaw, Mich., who declared that larger production with less effort and cost could be achieved. They outlined what they believed to be the main principles of motion economy as applied to machine shop operations and tool design: (1)—Eliminate all unnecessary movements of the workmen; (2)—shorten and simplify all necessary movements; (3)—balance the work; (4)—minimize use of the eyes; and (5)—eliminate the use of hands as holding devices. They then illustrated some ways in which these principles could be applied.

Thomas Barish, assistant chief engineer, Marlin-Rockwell Corp., Jamestown, N. Y., outlined a method for calculating the deflection in machine tool spindles and ball bearings to evaluate the relative merits of the length and diameter of the spindle, the types of ball bearings, the number of bearings, and the location of them.

The method, he said, has proved especially valuable in comparing the three different types of spindle-bearing mountings: (1) Two single-row bearings (at each end); or (2) a 3-bearing mounting with two together at the nose; or (3) with these two spread. For the last case, the calculations indicate how far to spread the two bearings. The method has also served to accentuate a movement toward shorter, larger spindles, and simpler designs.

The principle, Mr. Barish said, upon which such design analyses must be based is that the total maximum deflections of the spindle, bearings, and frame under the expected loads shall be less than the smallest allowable depth of chatter mark.

Factors of stress concentrations in plates of finite width, with central circular holes loaded through pins or rivets, were discussed by M. M. Frocht, associate professor, Carnegie Institute of Technology, Pittsburgh, and H. N. Hill, Aluminum Research Laboratories, New Kensington, Pa.

Two sets of test results were presented, one from oversize aluminum specifications in which the stresses were determined from strain-gage measurements and the other from photoelastic tests with small bakelite models. The strain gage tests and the photoelastic tests were conceived and executed independently, the authors said, at the Aluminum Research Laboratories and Carnegie institute, respectively, with results in considerable agreement.

Joints Bolted or Riveted

The paper dealt primarily with the problem of determining stress concentrations in a riveted or bolted joint, reduced to its simplest form. While a knowledge of the stress-concentration factors for this simple case is not in itself sufficient for the determination of the maximum stresses in a complicated joint, test results indicated, the authors declared, that these factors probably represent upper limits. A knowledge of stress-concentration factors, they said, might be of rather limited value in a study of the fatigue strength of riveted or bolted joints of mild steel (a material for which the endurance limit is just slightly less than the yield strength), but the value might not be so limited when dealing with joints of high-strength alloy steels or lightweight alloys (materials for which the endurance limits are well within the elastic range).

The strain-gage tests employed a 1-inch thick plate of high-strength aluminum alloy of the duralumin type and an 8-inch diameter pin. While most of the tests involved plates loaded through a single pin in a hole on the longitudinal center line of the plate, several tests were made on plates loaded through two pins symmetrically situated about the center of the plate.

Referring to applications of photoelasticity, M. Hetenyi, research laboratories, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., discussed three particular problems in turbine-generator design, stating that the connection between the three is only their mutual sphere of application and the fact that in each case the solution has been obtained by photoelasticity. The three problems are (a) stress concentrations in transverse grooves of 2-pole generator rotors, (b) centrifugal stresses in rotors, and (c) stress concentrations in T-heads (bolts and blade fastenings).

Freezes Stresses in Samples

The problems have been investigated, the speaker said, as 2-dimensional ones, the first and third being analyzed by the standard photoelastic technique, while in the second problem the fundamentally 3-dimensional method of "freezing" the stresses in bakelite samples was applied.

R. E. Newton, instructor in applied science, Washington university, St. Louis, stated that recent experiments of M. Hetenyi and others in developing a technique for freezing stresses in bakelite and other photoelastic plastics have broadened tremendously the scope of the photoelastic method of stress analysis. In addition to making possible the solution of 3-dimensional problems, the new technique, he said, offers itself as a powerful tool in solving problems in which it is inconvenient to study the fringe pattern, while the model is actually under load. Problems of centrifugal stresses in constant-speed motors fall in this class and are readily handled by the stress-freezing method.

These and other observations were made by the speaker in his discussion of the application of the technique to the determination of the stresses in rotating disks of uniform thickness having symmetrically placed non-central holes.

A paper, "A Theoretical Investigation of Plastic Torsion in an I-Beam," prepared by D. G. Christopherson, University college, Oxford university, Oxford, England; was read at the meeting. It described a study by the author of the distribution of stress in an I-beam in torsion by a method of successive approxi-

mation, with regions of initial yielding determined for several values of the angle of the twist.

C. W. MacGregor, associate professor of applied science, Massachusetts Institute of Technology, Cambridge, Mass., described a method, developed at his school, of determining the average true stress-strain curve in tension for a material, from the beginning of yielding to fracture under ordinary testing speeds, by the observation during the test of only two loads applied to a tapering specimen, namely the maximum and fracture loads. He said that the diameters at various positions along the tapered specimens were measured before and after the test, and that stress and reduction-of-area values were computed from these observations.

Steel Serving Chemical Field

■ NEW developments in materials and equipment featured the Seventeenth Exposition of Chemical Industries at Grand Central Palace, New York, last week, attended by a new high record total of more than 55,000 persons, eclipsing the 1937 record of 46,290.

Several hundred companies exhibited products, including all types of plant and laboratory equipment and supplies, containers, instruments and materials handling equipment.

Corrosion-resistant metals and alloys for the chemical industries stood out prominently. Steel companies represented included Allegheny Ludlum Steel Corp., Brackenridge, Pa.; Ingersoll Steel & Disc Division, Borg-Warner Corp., Chicago; Lukens Steel Co., Coatesville, Pa.; Republic Steel Corp., Cleveland; John A. Roebling's Sons Co., Trenton, N. J.; and United States Steel Corp. subsidiaries, all of which featured stainless steels. Ingersoll showed a 20 per cent stainless clad material, the carbon steel backing being cast upon the stainless before rolling.

International Nickel Co. Inc., New York, had a complete display of nickel and nickel alloys, setting forth applications in these industries. Aluminum Co. of America, Pittsburgh, showed the wide variety of applications for aluminum, such as for containers and pressure cookers. Baker & Co., Newark, N. J., exhibited platinum clad nickel for handling highly corrosive materials.

New instruments and redesigned previous models were on display for the first time. Leeds & Northrup Co., Philadelphia, showed a new pH controller with glass electrode which maintains proper hydrogen ion concentration. Also shown was a new gas analyzer and choice of controls for regulation of SO_2 gas.

Foxboro Co., Foxboro, Mass., had on display its engineered process control, in which one cam and time-delay relays control a complete operating cycle in place of the usual cam for each part of the cycle. Bristol Co., Waterbury, Conn., showed an electronic controller. Also, Bristol now offers recording potentiometers which record both dots and numbers. Brown Instrument Co., Philadelphia, showed redesigned pressure and temperature recorders with more powerful elements to provide closer control.

Allis-Chalmers Mfg. Co., Milwaukee, expects to open new fields for arc welding with its new electronic welder. It has a range of 5 to 75 amperes capacity, and will join material from 35-gage to ¼-inch without distortion.

A number of innovations in fabricating methods were noted. Farwell, Ozum, Kirk & Co., St. Paul, featured stainless steel tanks with sanitary corners effected by welding away from those corners. This company also welds stainless sink bowls up to 30 by 50 inches and 8 inches deep from a single sheet, thus eliminating die costs. Another new development is the production and stocking of welded nickel and monel pipe and fittings.

Yale & Towne Mfg. Co., Philadelphia, had a large display of electric trucks.

Further development work on alloys is being done by valve makers, including chromium-molybdenum cast steels for high temperature work. New processes in the oil industry necessitate valves capable of withstanding both high pressures and temperatures.

Holds Clinic on Cold Working

■ "An experiment in adult education" was a clinic on cold working of metals held last week at Carnegie Institute of Technology, Pittsburgh, under auspices of the department of metallurgy and metals research laboratory.

This, the first in a projected series of conferences on subjects of importance to the metallurgical industries, attracted 200 to hear a series of nine lectures and discussions. Speakers were authorities on their subjects from industry and from technical institutions.

According to Dr. R. F. Mehl, professor of metallurgy at Carnegie institute, future clinics will be based on a wide variety of advanced metallurgical problems and will deal with many phases of metals. Attendance at the initial sessions ranged from students to nationally-known metallurgists.

Maxwell Gensamer, associate professor of metallurgy at Carnegie institute opened the sessions with two lectures, "Nature of Cold Work" and "Preferred Orientations and Directional Properties." Basic theories of cold working were outlined by the speaker, together with results of recent researches. Effects of cold work on mechanical properties were described by S. L. Hoyt, Battelle Memorial institute, Columbus, O., including the importance to industry of strain-aging, defects and the causes of various types of failures of metals encountered in use.

Laws of Flow Discussed

Dr. George Sachs, professor of metallurgy, Case School of Applied Science, Cleveland, O., delivered two lectures, "Flow of Metals in Forming Operations" and "Cold Rolling." Covering the fundamental laws of flow, he discussed the effects of speed and temperature of operations, described the stresses caused by typical cold forming operations and outlined the part played by friction. In the second lecture, Dr. Sachs outlined the advantage and disadvantages of various types of modern rolling mills. Effect of both front and back tension on the operations was covered, as well as power consumption. Design and care of rolls was stressed, and changes in properties of metals produced by cold rolling were outlined by the speaker.

Examples of modern deep drawing operations were shown by Joseph Winlock, metallurgist, Edward G. Budd Mfg. Co., Philadelphia. Necessity of quality control in sheet manufacture for deep drawing qualities was stressed. Elmer E. Legge, director of research, American Steel & Wire Co., Worcester, Mass., described cold drawing procedure on wire, bars and tubes, including lubrication, cleaning and heat treating, elimination of defects and importance of surface finish. Dr. Mehl outlined recovery and crystallization, including the effects of annealing on cold working of metals, and E. G. deCoriolis, research director, Surface Combustion Corp., Toledo, O., showed the practical side of annealing, outlining what furnaces in use today can actually do.

The sessions closed with a dinner Dec. 8, at which Walther Mathesius, vice president in charge of operations, United States Steel Corp. of Delaware, Pittsburgh, was the principal speaker.

Shipments Drawing Ahead of Bookings

Output Not Influenced By Order Decline; Backlogs Heavy

MARKET IN TABLOID ★

Demand
Strong for prompt shipment; forward buying quieter.

Prices
Steady; most ferroalloys reaffirmed for next quarter.

Production
Unchanged at 94 per cent.

■ MODERATION in forward buying of steel products is more pronounced, and orders are falling slightly behind shipments.

This reversal, expected for several weeks, is without effect on deliveries, although unfilled orders are declining gradually. Steelmaking last week was unchanged at 94 per cent, despite brief fluctuations in output for furnace repairs.

Backlogs for prompt shipment are sufficient to maintain ingot output near its present rate into next quarter, with deliveries on some products extending into February. Since many buyers already are well covered four to six weeks ahead, the tapering in forward commitments is regarded as natural, particularly since prospects for stable prices the next few months are relatively good.

Consumer inventories have been enlarged the past ten weeks to a level more commensurate with the higher rate of metalworking operations, consequently future steel demand would be expected to be lighter even with sustained consumption. Buyers apparently either do not regard present stocks as excessive or are not concerned with reducing them during the approaching inventory-taking period, since requests for deferred shipments are relatively few.

For the second successive month ingot production has established an all-time record. November stands as the new peak with 5,462,616 gross tons, or 176,370 tons more than the best 1929 figure, attained in May that year. Correspondingly heavy output of rolled products the past few weeks is becoming reflected in better deliveries on some products. February shipment generally is asked on bars, rods and wire, but certain grades of sheets are available within four to six weeks, in some instances sooner. Structural shapes are obtainable on fairly short notice.

Shapes and concrete reinforcing bars are in lighter demand than most other products. Awards are smaller than a year ago, when there was a rush to complete contracting for PWA projects. Part of the current lull is seasonal, but it also reflects the urgency with which pending and contemplated work was closed a few weeks ago in anticipation of higher steel prices and delayed deliveries. The outlook for early 1940 in building and heavy engineering construction is regarded as favorable; meanwhile fabricators' backlogs are declining. Outstanding in pending structural business is 17,000 tons for the Pitt river bridge, California.

Orders for 25,000 tons of line pipe have been awarded by Panhandle Eastern Pipe Line Co. to A. O. Smith Corp. and National Tube Co.

The automotive industry is back among the leaders in steel consumption. Assemblies last week spurted nearly 22,000 units to a new high for the year at 115,488. This is 15.5 per cent larger than a year ago and within striking distance of the best weekly pace ever attained in the fourth quarter—124,000 units in December, 1936. Practically all of last week's gain was furnished by the reopened Chrysler plants.

Railroads are accounting for heavy steel shipments both directly to car shops and to equipment builders, but new orders for track material and freight cars are scant. Locomotive buying has been more prominent lately, five roads placing contracts for a total of 17 diesel-electric and 7 electric units.

Scrap prices are declining more slowly, following a sharp drop which almost matched in abruptness the September rise. Signs of a leveling off in quotations are appearing in some districts. Last week the price composite was down 33 cents to $18, lowest in three months.

Leading ferroalloy sellers have reaffirmed base prices for next quarter, with the exception of chrome alloys, on which an increase of about 5 per cent will be made. Pig iron producers generally are accepting first quarter business at unchanged prices, except for the $1 advance now effective on silvery iron, as announced a week ago. Firmness rules finished steel quotations, the composite continuing $56.10, compared with $56.50 a year ago.

Steady schedules were maintained last week in leading steelmaking areas. Pittsburgh and Chicago both held at 94 per cent, with eastern Pennsylvania at 88. Youngstown was up 1 point to 93, Detroit rose 3 points to 96 and St. Louis increased 2 points to 83. Reductions were 3 points to 90 at Buffalo, ½ point to 89½ at Cleveland and 10 points to 90 in New England. Unchanged districts also included Wheeling at 93, Birmingham at 94 and Cincinnati at 80.

COMPOSITE MARKET AVERAGES

	Dec. 9	Dec. 2	Nov. 25	One Month Ago Nov., 1939	Three Months Ago Sept., 1939	One Year Ago Dec., 1938	Five Years Ago Dec., 1934
Iron and Steel	$37.26	$37.26	$37.42	$37.50	$36.67	$36.36	$32.39
Finished Steel	56.10	56.10	55.90	55.90	55.60	56.50	54.00
Steelworks Scrap..	18.00	18.33	19.50	20.06	17.97	14.77	11.02

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Dec. 9, 1939	Nov. 1939	Sept. 1939	Dec. 1938
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.25c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.47	2.47	2.47	2.57
Iron bars, Terre Haute, Ind.	2.15	2.15	2.125	2.05
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15-2.40	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.00	2.00	2.15
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.20
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.00	2.00	2.00
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.60
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.40	2.45

Semifinished Material

Sheet bars, Pittsburgh, Chicago.	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods, No. 5 to $\frac{9}{32}$-inch, Pitts.	2.00	1.92	1.92	1.92

Pig Iron

	Dec. 9, 1939	Nov. 1939	Sept. 1939	Dec. 1938
Bessemer, del. Pittsburgh	$24.34	$24.34	$23.35	$22.34
Basic, Valley	22.50	22.50	21.50	20.50
Basic, eastern, del. Philadelphia.	24.34	24.34	23.54	22.34
No. 2 foundry, Pittsburgh	24.21	24.21	23.20	22.21
No. 2 foundry, Chicago	23.00	23.00	23.00	22.20
Southern No. 2, Birmingham	19.38	19.38	18.58	17.38
Southern No. 2, del. Cincinnati	22.89	22.89	22.09	20.89
No. 2X, del. Phila. (differ. av.)	25.215	25.215	24.415	23.215
Malleable, Valley	23.00	23.00	22.00	21.00
Malleable, Chicago	23.00	23.00	23.00	22.50
Lake Sup., charcoal, del. Chicago	30.34	30.34	30.34	29.84
Gray forge, del. Pittsburgh	23.17	23.17	22.15	21.17
Ferromanganese, del. Pittsburgh	105.33	105.33	95.35	97.77

Scrap

Heavy melting steel, Pittsburgh	$19.00	$21.90	$18.75	$15.50
Heavy melt. steel, No. 2, E. Pa.	17.75	19.25	17.10	13.20
Heavy melting steel, Chicago	16.75	17.45	19.25	16.05
Rails for rolling, Chicago	19.75	20.50	21.90	19.65
Railroad steel specialties, Chicago	20.25	21.50	21.75	18.00

Coke

Connellsville, furnace, ovens	$4.75	$5.00	$3.75	$3.75
Connellsville, foundry, ovens	5.75	6.00	5.00	5.00
Chicago, by-product fdry., del.	10.50	11.25	10.50	10.50

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled

Pittsburgh	2.10c
Chicago, Gary	2.10c
Cleveland	2.10c
Detroit, del.	2.20c
Buffalo	2.10c
Sparrows Point, Md.	2.10c
New York, del.	2.34c
Philadelphia, del.	2.27c
Granite City, Ill.	2.20c
Middletown, O.	2.10c
Youngstown, O.	2.10c
Birmingham	2.10c
Pacific Coast points	2.60c

Cold Rolled

Pittsburgh	3.05c
Chicago, Gary	3.05c
Buffalo	3.05c
Cleveland	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.37c
New York, del.	3.39c
Granite City, Ill.	3.15c
Middletown, O.	3.05c
Youngstown, O.	3.05c
Pacific Coast points	3.65c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast points	4.00c

Black Plate, No. 29 and Lighter

Pittsburgh	3.05c
Chicago, Gary	3.05c
Granite City, Ill.	3.15c

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.80c
Pacific Coast	4.50c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.35c	3.95c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	24.00	35.00
Cold stp.	22.00	22.50	32.00	52.00

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c-2.54c
Philadelphia, del.	2.15c-2.40c
Boston, delivered	2.46c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, Pa.	2.35c
Sparrows Point, Md.	2.10c
Claymont, Del.	2.10c-2.35c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast points	2.60c

Steel Floor Plates

Pittsburgh	3.35c
Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	3.95c

Standard Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast points	2.70c

Tin and Terne Plate

Tin Plate, Coke (base box)

Pittsburgh, Gary, Chicago	$5.00
Granite City, Ill.	5.10

Mfg. Terne Plate (base box)

Pittsburgh, Gary, Chicago	$4.30
Granite City, Ill.	4.40

Bars

Soft Steel

(Base, 20 tons or over)

Pittsburgh	2.15c
Chicago or Gary	2.15c
Duluth	2.25c
Birmingham	2.15c
Cleveland	2.15c
Buffalo	2.15c
Detroit, delivered	2.25c
Philadelphia, del.	2.47c
Boston, delivered	2.52c
New York, del.	2.49c
Gulf ports	2.50c
Pacific Coast points	2.75c

Rail Steel

(Base, 5 tons or over)

Pittsburgh	2.15c
Chicago or Gary	2.15c
Detroit, delivered	2.25c
Cleveland	2.15c

Buffalo	2.15c
Birmingham	2.15c
Gulf ports	2.50c
Pacific Coast points	2.75c

Iron

Chicago, Terre Haute	2.15c
Philadelphia	2.37c
Pittsburgh, refined	3.50-8.00c

Reinforcing

*New Billet Bars, Base**

Chicago, Gary, Buffalo, Cleve., Birm., Young., Sparrows Pt., Pitts.	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.60c

*Rail Steel Bars, Base**

Pittsburgh, Gary Chicago, Buffalo, Cleveland, Birm.	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.60c

**Subject to a deduction of 25 cents per 100 lbs. in lots of 20 tons or over of one size, in lengths of 30 feet or over, for shipment at one time to one destination.*

Wire Products

Pitts-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard and cement coated wire nails	$2.55
(Per pound)	
Polished fence staples	2.55c
Galv. barbed wire, standard 12½ gage two-point hog, 80-rod spool $2.88; two-point cattle, 80-rod spool	$2.70
Annealed fence wire	2.90c
Galv. fence wire	3.30c
Woven wire fencing (base C. L. column)	67.00
Single loop bale tie (base C. L. column)	56.00

To Manufacturing Trade

Base, Pitts. - Cleve. - Chicago-Birmingham (except spring wire)

Bright bess., basic wire	2.60c
Galvanized wire	2.65c
Spring wire	3.20c

Worcester, Mass., $2 higher on bright basic and spring wire.

Cut Nails

Carload, Pittsburgh $3.70

Cold-Finished Bars

	Carbon	Alloy
Pittsburgh	2.65c	3.35c
Chicago	2.65c	3.35c
Gary, Ind.	2.65c	3.35c
Detroit	2.70c	*3.45c
Cleveland	2.65c	3.35c
Buffalo	2.65c	3.35c

* Delivered.

Alloy Bars (Hot)

(Base, 20 tons or over)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	2.70c
Detroit, delivered	2.80c

Alloy S.A.E.	Alloy Diff.	Alloy S.A.E.	Alloy Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.55	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo.	0.55
4600 0.20 to 0.30 Mo. 1.50-2.00 Ni.	1.10
5100 0.80-1.10 Cr.	0.45
5100 Cr. spring flats	0.15
6100 bars	1.20
6100 spring flats	0.85
Cr. N., Van.	1.50
Carbon Van.	0.85
9200 spring flats	0.15
9200 spring rounds, squares	0.40

Electric furnace up 50 cents.

Strip and Hoops

(Base, hot strip, 1 ton or over; cold, 3 tons or over)

Hot Strip, 12-inch and less

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham	2.10c
Detroit, del.	2.20c
Philadelphia, del.	2.42c
New York, del.	2.46c
Pacific Coast points	2.70c
Cooperage hoop, Youngs., Pitts.; Chicago, Birm.	2.20c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown	2.80c
Chicago	2.90c
Detroit, del.	2.90c
Worcester, Mass.	3.00c

Carbon	Cleve., Pitts.
0.26—0.50	2.80c
0.51—0.75	4.30c
0.76—1.00	6.15c
Over 1.00	8.35c

Worcester, Mass. $4 higher.

Commodity Cold-Rolled Strip

Pitts.-Cleve.-Youngstown	2.95c
Chicago	3.05c
Detroit, del.	3.05c
Worcester, Mass.	3.35c

Lamp stock up 10 cents.

Rails, Fastenings

(Gross Tons)

Standard rails, mill	$40.00
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham.	$40.00
Do., rerolling quality	39.00

Cents per pound

Angle bars, billet, mills	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.15c
Car axles forged, Pitts., Chicago, Birmingham	3.15c
Tie plates, base	2.15c

Base, light rails 25 to 60 lbs., 20 lbs., up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, for full containers additional 10%.

Carriage and Machine

½ x 6 and smaller	68.5 off
Do. larger, to 1-in.	66 off
Do. 1⅛ and larger	64 off
Tire bolts	52.5 off

Stove Bolts

In packages with nuts separate 72.5 off; with nuts attached add 15%; bulk 83.5 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts	60 off
Plow bolts	68.5 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
6-inch and less	67	70
⅞-1-inch	64	65
1⅛ and larger	62	62

Hexagon Cap Screws

Upset, 1-in., smaller	70.0 off

Square Head Set Screws

Upset, 1-in., smaller	75.0 off
Headless set screws	64.0 off

Piling

Pitts., Chgo., Buffalo	2.40c
Gulf ports	2.85c
Pacific coast ports	2.90c

Rivets, Washers

Structural. Pittsburgh, Cleveland, Chicago ... 3.40c

⅞-inch and smaller, Pitts., Chi., Cleve. ..65-10 off

Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75 off

Welded Iron, Steel Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

Steel

In.	Blk.	Galv.
½	63½	54
¾	66½	58
1—3	68½	60½

Iron

¾	30	13
1—1¼	34	19
1½	38	21½
2	37½	21

Lap Weld

Steel

2	61	52½
2½—3	64	55½
3½—6	66	57½
7 and 8	65	55½
9 and 10	64½	55
11 and 12	63½	54

Iron

2	30½	15
2½—3½	31½	17½
4	33½	21
4½—8	32½	20
9—12	28½	15

Line Pipe

Steel

1 to 3, butt weld	67½
2, lap weld	60
2½ to 3, lap weld	63
3½ to 6, lap weld	65
7 and 8, lap weld	64
10-inch lap weld	63½
12-inch, lap weld	62½

Iron

	Blk.	Galv.
¾ butt weld	25	7
1 and 1¼ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½" O.D.	13	$ 9.72	$23.71
1¾" O.D.	13	11.06	22.93
2" O.D.	13	12.38	19.35
2¼" O.D.	13	13.79	21.68
2¼" O.D.	12	15.16	.....
2½" O.D.	12	16.58	26.57
2¾" O.D.	12	17.54	29.00
3" O.D.	12	18.35	31.36
3½" O.D.	11	23.15	39.81
4" O.D.	10	28.66	49.90
5" O.D.	9	44.25	73.93
6" O.D.	7	68.14	.....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1 "O.D.	13	$ 7.82	$ 9.01
1¼"O.D.	13	9.26	10.67
1½"O.D.	13	10.23	11.79
1¾"O.D.	13	11.64	13.42
2" O.D.	13	13.04	15.03
2¼"O.D.	13	14.54	16.76
2¼"O.D.	12	16.01	18.45
2½"O.D.	12	17.54	20.21
2¾"O.D.	12	18.59	21.42
3" O.D.	12	19.50	22.48
3½"O.D.	11	24.62	28.37
4" O.D.	10	30.54	35.20
4½"O.D.	10	37.35	43.04
5" O.D.	9	46.87	54.01
6" O.D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm.	$45.00-46.00
4-in., Birmingham	48.00-49.00
4-in., Chicago	56.80-57.80
6-in. & over, Chicago	53.80-54.80
6-in. & over, east fdy.	49.00
Do., 4-in.	52.00

Class A Pipe $3 over Class B
Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Rerolling Billets, Slabs

(Gross Tons)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Young., Birm., Sparrows Point	$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets

Pitts., Chi., Gary, Cleve., Young., Buffalo, Birm.	40.00
Duluth	42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅝-inch incl. (per 100 lbs.) $2.00
Do., over ⅜ to 47/64-in. incl. 2.15
Worcester up $0.10; Galveston up $0.30; Pacific Coast up $0.45.

Skelp

Pitts., Chi., Youngstown, Coatesville, Sparrows Pt.	1.90c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$4.75- 5.25
Connellsville, fdry.	5.50- 6.00
Connell. prem. fdry.	5.75- 6.25
New River fdry.	6.50- 6.75
Wise county fdry	5.50- 6.50
Wise county fur.	5.00- 5.25

By-Product Foundry

Newark, N. J., del.	11.38-11.85
Chicago, outside del.	10.50
Chicago, delivered	11.25
Terre Haute, del.	10.75
Milwaukee, ovens	11.25
New England, del.	12.50
St. Louis, del.	11.75
Birmingham, ovens	7.50
Indianapolis, del.	10.75
Cincinnati, del.	10.50
Cleveland, del.	11.05
Buffalo, del.	11.25
Detroit, del.	11.00
Philadelphia, del.	11.15

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	16.00c
Toluol, two degree	22.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (less than 1000 lbs.)	14.75c
Do. (1000 lbs. or over)	13.75c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	6.75c

Per ton, bulk, f.o.b. port

Sulphate of ammonia	$28.00

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$24.00	$24.50	$23.50	$25.00
Birdsboro, Pa.	24.00	24.50	23.50	25.00
Birmingham, Ala.‡	19.38	.....	18.38	24.00
Buffalo	23.00	23.50	22.00	24.00
Chicago	23.00	23.00	22.50	23.50
Cleveland	23.00	23.00	22.50	23.50
Detroit	23.00	23.00	22.50	23.50
Duluth	23.50	23.50	.....	24.00
Erie, Pa.	23.00	23.50	22.50	24.00
Everett, Mass.	24.00	24.50	23.50	25.00
Granite City, Ill.	23.00	23.00	22.50	23.50
Hamilton, O.	23.00	23.00	22.50	.....
Neville Island, Pa.	23.00	23.00	22.50	23.50
Provo, Utah	21.00	.....	.....	.....
Sharpsville, Pa.	23.00	23.00	22.50	23.50
Sparrow's Point, Md.	24.00	.....	23.50	.....
Swedeland, Pa.	24.00	24.50	23.50	25.00
Toledo, O.	23.00	23.00	22.50	23.50
Youngstown, O.	23.00	23.00	22.50	23.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	24.39	24.39	23.89	24.89
Baltimore from Birmingham	24.78	.....	23.66	.....
Boston from Birmingham	24.12	.....	.....	.....
Boston from Everett, Mass.	24.50	25.00	24.00	25.50
Boston from Buffalo	24.50	25.00	24.00	25.50
Brooklyn, N. Y., from Bethlehem	26.50	27.00	.....	.....
Canton, O., from Cleveland	24.39	24.39	23.89	24.89
Chicago from Birmingham	†23.22	.....	.....	.....
Cincinnati from Hamilton, O.	23.24	24.11	23.61	.....
Cincinnati from Birmingham	23.06	.....	22.06	.....
Cleveland from Birmingham	23.32	.....	22.82	.....
Mansfield, O., from Toledo, O.	24.94	24.94	24.44	24.44
Milwaukee from Chicago	24.10	24.10	23.60	24.60
Muskegon, Mich., from Chicago, Toledo or Detroit	26.19	26.19	25.69	26.69
Newark, N. J., from Birmingham	25.15	.....	.....	.....
Newark, N. J., from Bethlehem	25.53	26.03	.....	.....
Philadelphia from Birmingham	24.46	.....	23.96	.....
Philadelphia from Swedeland, Pa.	24.84	25.34	24.34	.....
Pittsburgh district from Neville Island	Neville base, plus 69c, 84c, and $1.24 freight.			
Saginaw, Mich., from Detroit	25.45	25.45	24.95	24.95
St. Louis, northern	23.50	23.50	23.00	....
St. Louis from Birmingham	†23.12	....	22.62	....
St. Paul from Duluth	25.63	25.63	....	26.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $28.50, base; $29.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$22.50	Lake Superior fur.	$27.00
Pitts. dist. fur.	22.50	do., del. Chicago	30.34
		Lyles, Tenn.	26.50

†Silvery

Jackson county, O., base: 6-6.50 per cent $28.50; 6.51-7—$29.00; 7-7.50—$29.50; 7.51-8—$30.00; 8-8.50—$30.50; 8.51-9—$31.00; 9-9.50—$31.50; Buffalo, $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$47.50
Joliet, E. Chicago	55.10
Birmingham, Ala.	47.50

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$28.00
Wire cut	$26.00

Magnesite

Imported dead - burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Do. domestic	40.00
Do., f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00
Quickset magnesite grains, f.o.b. Chewelah, Wash., net, bulk	22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$47.00
Chem. bonded chrome	47.00
Magnesite brick	67.00
Chem. bonded magnesite	57.00

Fluorspar

Washed gravel, duty pd., tide, net ton	$25.00-$26.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	22.00
Do. barge	22.00
No. 2 lump	22.00

Ferroalloy Prices

Ferromanganese, 78-82%, tide., duty pd. $100.00; Do., del. Pitts., 105.33

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot 32.00; Do., 26-28% 39.50

Ferrosilicon, 50% freight allowed, c.l. 69.50; Do., ton lot 80.50; Do., 75 per cent 126.00. Spot, $5 a ton higher.

Silicomanganese, 2½ c. 103.00 2% carbon, 108.00; 1%, 118.00. Contract ton price $11 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 2.00-2.10

Ferrovanadium, 35 to 40%, lb., cont. 2.70-2.80-2.90

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electrolytic, per ton, c. l., 23-26% f.o.b. Monsanto, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots 10.50c; Do., ton lots 11.25c; Do., less-ton lots 11.50c

67-72% carloads, 2% carbon, per lb. contained chrome 16.50c; Do., ton lots 17.25c; Do., less-ton lots 17.75c

	Carloads	Ton lots	Less ton
2% carb.	16.50c	17.25c	17.75c
1% carb.	17.50c	18.25c	18.75c
0.10% carb.	19.50c	20.25c	20.75c
0.20% carb.	18.50c	19.25c	19.75c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40-45%, lb., con. tl., f.o.b. Niagara Falls, ton lots 1.23; Do., less-ton lots 1.25; 20-25% carbon, 0.10 max., ton lots, lb. 1.35; Do, less-ton lots 1.40. Spot 5c higher

Ferrocolumbium, 50-60%, contract, lb. con. col., f.o.b. Niagara Falls 2.25; Do., less-ton lots 2.30. Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, tl., 6-8% carb., carlots, contr., net ton 142.50; Do, spot 145.00; Do, contract, ton lots 145.00; Do, spot, ton lots 150.00

15-18% tl., 3-5% carbon, carlots, contr., net ton 157.50; Do, spot 160.00; Do, contract, ton lots 160.00; Do, spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c; Do, ton lots 8.00c; Do, less-ton lots 8.50c. Spot ½c lb. higher

Chromium Briquets, contract, any quantity, freight allowed, lb. 7.25c; Do, spot carlots, bulk 7.50c; Do, ton lots 8.00c; Do., less-ton lots 8.25c

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. $2.50; Do., smaller lots 2.60

Vanadium Pentoxide, contract, lb. contained $1.10; Do, spot 1.15

Chromium Metal, 98% cr., 0.50 carbon max., contract, lb. con. chrome 80.00c; Do, spot 85.00c

88% chrome, contract 79.00c; Do, spot 84.00c

Silicon Metal, 1% iron, contract, carlots, 2 x ⅛-in., lb. 14.00c; Do., 2% 12.50c. Spot ¼c higher

Silicon Briquets, contract carloads freight allowed, ton $69.50; Carload, spot 74.50; Less-ton lots, lb. 3.75c

Manganese Briquets, contract carloads, bulk freight allowed, lb. 5.00c; Ton lots 5.50c; Less-ton lots 5.75c. Spot ¼c higher

Zirconium Alloy, 12-15%, contract, carloads, gross ton $97.50; Do, spot 102.50

34-40%, contract, carloads, lb., alloy 14.00c; Do, ton lots 15.00c; Do, less-ton lots 16.00c. Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60; Do, 100-200 lb. lots 2.75; Do, under 100-lb. lots 3.00

Molybdenum Oxide Briquets, 48-52% molybdenum, per pound contained, f.o.b. producers' plant 80.00c

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets: Hot Rolled	Sheets: Cold Rolled	Sheets: Galv. No. 24	Cold Rolled Strip	Cold Drawn Bars: Carbon	Cold Drawn Bars: SAE 2300	Cold Drawn Bars: SAE 3100
Boston	3.98	4.06	5.06	3.85	3.85	5.66	3.71	4.78	4.86	3.46	4.13	8.63	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.58	4.60	5.23	3.51	4.09	8.59	7.19
Philadelphia	3.85	3.85	4.35	3.55	3.55	5.25	3.55	4.55	4.93	3.51	4.06	8.56	7.16
Baltimore	3.95	4.05	4.45	3.70	3.70	5.25	3.55	....	5.05	....	4.05	....	....
Norfolk, Va.	4.15	4.25	....	3.90	3.90	5.45	3.75	....	5.40	....	4.15	....	....
Buffalo	3.35	3.82	3.82	3.62	3.40	6.40	4.20	4.40	4.50	3.42	3.75	8.15	6.75
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	. .	4.75	3.35	3.65	8.35	6.95
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.05	4.72	3.20	3.75	8.15	6.75
Detroit	3.58	3.68	3.68	3.75	3.80	5.42	3.43	4.50	4.84	3.40	3.80	8.45	7.05
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	4.37	4.67	3.45	4.00	8.50	7.10
Chicago	3.50	3.60	3.60	3.55	3.55	5.15	3.35	4.30	4.85	3.50	3.75	8.15	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.40	3.60	4.95	5.00	3.83	4.34	8.84	7.44
Milwaukee	3.63	3.73	3.73	3.68	3.68	5.28	3.48	4.43	4.98	3.54	3.88	8.38	6.98
St. Louis	3.62	3.72	3.72	3.47	3.47	5.07	3.38	4.32	4.52	3.61	4.02	8.52	7.12
Kansas City	4.05	4.15	4.15	4.00	4.00	5.60	3.90	....	5.00	....	4.30	....	....
Memphis	3.90	4.00	4.00	3.95	3.95	5.71	3.75	....	5.00	....	4.31	....	....
Chattanooga	3.80	3.90	3.90	3.85	3.85	5.68	3.65	....	4.40	....	4.39	....	....
Tulsa, Okla.	4.44	4.54	4.54	4.33	4.33	5.93	4.24	....	5.19	....	4.69	....	....
Birmingham	3.50	3.60	3.60	3.55	3.55	5.88	3.35	....	4.85	...	4.43	....	..
New Orleans	4.00	4.10	4.10	3.80	3.80	5.75	3.85	....	4.80	5.00	4.60	....	....
Houston, Tex.	4.05	6.20	6.20	4.05	4.05	5.75	4.20	....	5.25	....	....	....	....
*Seattle	4.00	3.85	5.20	3.40	3.50	5.75	3.70	6.50	4.75	....	5.75	....	....
Portland, Oreg.	4.25	4.50	6.10	4.00	4.00	5.75	3.95	6.50	4.75	....	5.75	....	.
Los Angeles	4.15	4.65	6.35	4.00	4.00	6.40	3.75	6.50	5.15	....	6.15	10.65	9.80
San Francisco	4.00	4.45	6.00	4.00	4.00	5.60	3.85	6.40	5.15	....	6.80	10.65	9.80

	SAE Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.18	7.50	6.05	5.80	7.90
New York (Met.)	4.04	7.35	5.90	5.65	....
Philadelphia	4.10	7.31	5.86	5.61	8.56
Baltimore	4.10	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.10	5.65	5.40	7.50
Pittsburgh	3.40	7.35	5.95	5.50	7.60
Cleveland	3.30	7.30	5.85	5.85	7.70
Detroit	3.63	7.42	5.97	5.72	7.19
Cincinnati	3.65	7.44	5.99	5.74	7.84
Chicago	3.70	7.10	5.65	5.40	7.50
Twin Cities	3.95	7.45	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.82	7.47	6.02	5.77	7.87
Seattle	5.85	....	8.00	7.85	8.65
Portland, Oreg.	5.70	8.85	8.00	7.85	8.65
Los Angeles	4.80	9.40	8.55	8.40	9.05
San Francisco	5.00	9.65	8.80	8.65	9.30

BASE QUANTITIES

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds, except 0-1999 pounds (hot rolled sheets only) in New York; 300-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300-4999 pounds in Portland, Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in Birmingham.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Kansas City and St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 300-4999 in San Francisco, Portland; any quantity in Twin Cities; 300-1999 in Los Angeles.

Galvanized Sheets: Base, 0-1499 pounds in New York, Tulsa; 150-1499 pounds in Cleveland, Milwaukee, Pittsburgh, Baltimore, Norfolk; 150-1049 in Los Angeles; 300-4999 in Portland, Seattle, San Francisco; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, St. Louis; 1500 and over in Chattanooga, Philadelphia; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco, 1000 and over in Portland, Seattle; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 or 2000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, Dec. 7

Export Prices f.o.b. Port of Dispatch—

By Cable or Radio

	British gross tons U. K. ports	£ s d	Continental Channel or North Sea ports, gross tons: Quoted in dollars at current value	**Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Si.	$19.60	5 0 0	$29.82	3 10 0
Basic bessemer	.....	.....	19.59	2 6 0
Hematite, Phos. .03-.05	20.58	5 5 0	.....	.....
Billets	$28.91	7 7 6	$31.95	3 15 0
Wire rods, No. 5 gage	44.61	11 7 6	57.51	6 15 0
Standard rails	$37.24	9 10 0	$48.99	5 15 0
Merchant bars	2.14c	12 5 0	2.66c	7 0 0
Structural shapes	1.95c	11 2 6	2.57c	6 15 0
Plates, †¼ in. or 5 mm.	1.91c	10 18 9	3.71c	9 15 0
Sheets, black, 24 gage or 0.5 mm.	2.73c	15 12 6	3.71c	9 15 0°
Sheets, gal., 24 ga., corr.	3.17c	18 2 6	4.66c	12 5 0
Bands and strips	2.14c	12 5 0	2.74c	7 4 0
Plain wire, base	3.41c	19 10 0	3.04c	8 0 0
Galvanized wire, base	4.07c	23 5 0	3.61c to 3.66c	9 10 0 to 9 12 6
Wire nails, base	....	.....	3.52c	9 5 0
Tin plate, box 108 lbs.	$ 4.21	1 1 6	.....	.....

British ferromanganese $100.00 delivered Atlantic seaboard duty-paid.

Domestic Prices at Works or Furnace—

Last Reported

	£ s d		French Francs		Belgian Francs		Reich §§Mark	
Fdy. pig iron, Si. 2.5	$21.17	5 8 0(a)	$15.08	679.30	$23.10	700	$25.33	63
Basic bess. pig iron	19.89	5 1 6(a)	.....	.....	.....	...	27.94 (b)	69.50
Furnace coke	5.73	1 9 2	5.00	225	7.43	225	7.64	19
Billets	32.83	8 7 6	22.84	1,029	28.38	860	38.79	96.50
Standard rails	1.78c	10 3 0	1.41c	1,405	2.06c	1,375	2.38c	132
Merchant bars	2.24c	12 16 0††	1.30c	1,304	1.88c	1,250	1.98c	110
Structural shapes	2.00c	11 8 0††	1.27c	1,268	1.88c	1,250	1.93c	107
Plates, †¼-in. or 5 mm.	2.02c	11 10 6††	1.65c	1,650	2.21c	1,475	2.29c	127
Sheets, black	2.82c	16 2 6§	1.96c	1,958‡	2.70c	1,800‡	2.59c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	3.26c	18 12 6	2.85c	2,850	6.00c	4,000	6.66c	370
Plain wire	3.15c	18 0 0	2.00c	2,000	3.00c	2,000	3.11c	173
Bands and strips	2.37c	13 11 0††	1.44c	1,444	1.95c	1,300	2.29c	127

†British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. °Close annealed. ††Rebate of 15s on certain conditions.

**Gold pound sterling not quoted. §§Last prices, no current quotations.

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; †indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1	16.50-17.00
Bos. dock No. 1 exp.	16.00-16.50
New Eng. del. No. 1	16.50-17.00
Buffalo, No. 1	18.00-18.50
Buffalo, No. 2	16.00-17.00
Chicago, No. 1	16.50-17.00
Chicago, auto, no alloy	15.50-16.00
Chicago, No. 2 auto	13.50-14.00
Cincinnati dealers	14.00-14.50
Cleveland, No. 1	17.50-18.00
Cleveland, No. 2	16.50-17.00
Detroit, No. 1	†13.50-14.00
Detroit, No. 2	†12.50-13.00
Eastern Pa., No. 1	18.50-19.00
Eastern Pa., No. 2	17.50-18.00
Federal, Ill.	15.00-15.50
Granite City, R. R.	16.00-16.50
Granite City, No. 2	14.50-15.00
Los Angeles, No. 1	16.50-17.00
Los Angeles, No. 2	15.50-16.00
L. A., No. 1 f.a.s.	18.50-19.50
L. A., No. 2 f.a.s	17.50-18.50
N. Y. dock No. 1 exp.	16.50
Pitts., No. 1 (R. R.)	20.50-21.00
Pittsburgh, No. 1	18.50-19.50
Pittsburgh, No. 2	17.00-17.50
St. Louis, R. R.	16.50-17.00
St. Louis, No. 2	14.50-15.00
San Francisco, No. 1	16.50-17.00
San Francisco, No. 2	15.50-16.00
Seattle, No. 1	14.50-15.50
Toronto, dlrs., No. 1	11.25
Valleys, No. 1	18.50-19.00

COMPRESSED SHEETS

Buffalo, new	16.00-16.50
Chicago, factory	16.00-16.50
Chicago, dealers	14.50-15.00
Cincinnati, dealers	13.50-14.00
Cleveland	17.00-17.50
Detroit	†14.50-15.00
E. Pa., new mat.	18.50-19.00
E. Pa., old mat.	16.50-17.00
Los Angeles	12.00-12.50
Pittsburgh	18.50-19.50
St. Louis	11.50-12.00
San Francisco	14.00-14.50
Valleys	18.00-18.50

BUNDLED SHEETS

Buffalo, No. 1	16.00-16.50
Buffalo, No. 2	14.00-14.50
Cleveland	13.50-14.00
Pittsburgh	17.00-17.50
St. Louis	10.50-11.00
Toronto, dealers	9.75

SHEET CLIPPINGS, LOOSE

Chicago	11.00-11.50
Cincinnati dealers	9.50-10.00
Detroit	†10.00-10.50
St. Louis	9.50-10.00
Toronto, dealers	6.75- 7.00

BUSHELING

Buffalo, No. 1	16.00-16.50
Chicago, No. 1	16.00-16.50
Cincin., No. 1, deal.	11.50-12.00
Cincinnati, No. 2	5.00- 5.50
Cleveland, No. 2	12.00-12.50
Detroit, No. 1, new	†13.50-14.00
Valleys, new, No. 1	18.00-18.50
Toronto, dealers	5.00- 5.50

MACHINE TURNINGS (Long)

Birmingham	7.50
Buffalo	11.00-11.50
Chicago	10.00-10.50
Cincinnati, dealers	6.50- 7.00
Cleveland, no alloy	11.00-11.50
Detroit	†8.00- 8.50
Eastern Pa.	13.00-13.50
Los Angeles	4.00- 5.00
New York	†7.00- 7.25
Pittsburgh	13.00-13.50
St. Louis	7.00- 7.50
San Francisco	5.00
Toronto, delaers	6.00- 6.25
Valleys	12.00-12.50

SHOVELING TURNINGS

Buffalo	13.50-14.00
Cleveland	12.00-12.50
Chicago	10.50-11.00
Chicago, spcl, anal.	12.50-13.00
Detroit	†10.50-11.00
Pitts., alloy-free	14.50-15.00

BORINGS AND TURNINGS
For Blast Furnace Use

Boston district	†6.00- 6.25
Buffalo	11.00-11.50
Cincinnati, dealers	5.00- 5.50
Cleveland	12.00-12.50
Eastern Pa.	12.00-12.50
Detroit	†7.75- 8.25
New York	†8.00- 8.50
Pittsburgh	12.00-12.50
Toronto, dealers	5.50- 6.00

AXLE TURNINGS

Buffalo	17.00-17.50
Boston district	†9.50-10.00
Chicago, elec. fur.	17.00-17.50
East. Pa. elec. fur.	16.50-17.00
St. Louis	11.50-12.00
Toronto	6.00- 6.50

CAST IRON BORINGS

Birmingham	7.00- 7.50
Boston dist. chem.	†9.50- 9.75
Buffalo	11.00-11.50
Chicago	9.00- 9.50
Cincinnati, dealers	5.00- 5.50
Cleveland	12.00-12.50
Detroit	†7.75- 8.25
E. Pa., chemical	14.50-15.00
New York	†8.00- 8.50
St. Louis	6.00- 6.50
Toronto, dealers	5.50- 5.75

RAILROAD SPECIALTIES

Chicago	20.00-20.50

ANGLE BARS—STEEL

Chicago	19.00-19.50
St. Louis	17.50-18.00

SPRINGS

Buffalo	21.50-22.00
Chicago, coil	20.00-20.50
Chicago, leaf	19.50-20.00
Eastern Pa.	24.00
Pittsburgh	24.00-24.50
St. Louis	19.00-19.50

STEEL RAILS, SHORT

Birmingham	12.00-12.50
Buffalo	22.00-22.50
Chicago (3 ft.)	19.50-20.00
Chicago (2 ft.)	20.00-20.50
Cincinnati, dealers	20.50-21.00
Detroit	†21.50-22.00
Pitts., 3 ft. and less	24.00-24.50
St. Louis, 2 ft. & less	20.00-20.50

STEEL RAILS, SCRAP

Boston district	†15.00-15.50
Buffalo	21.00-21.50
Chicago	16.75-17.25
Cleveland	21.00-21.50
Pittsburgh	21.50-22.00
St. Louis	16.50-17.00
Seattle	18.00-18.50

FROGS, SWITCHES

Chicago	16.50-17.00
St. Louis, cut	16.50-17.00

ARCH BARS, TRANSOMS

St. Louis	18.50-19.00

PIPE AND FLUES

Chicago, net	11.50-12.00
Cincinnati, dealers	11.00-11.50

RAILROAD GRATE BARS

Buffalo	12.00-12.50
Chicago, net	11.00-11.50
Cincinnati, dealers	9.00- 9.50
Eastern Pa.	16.00-16.50
New York	†12.50-13.00
St. Louis	12.00-12.50

RAILROAD WROUGHT

Birmingham	11.00-11.50
Boston district	†9.50-10.00
Eastern Pa., No. 1	20.00-20.50
St. Louis, No. 1	11.50-12.00
St. Louis, No. 2	15.00 15.50

FORGE FLASHINGS

Boston district	†11.75-12.00
Buffalo	16.00-16.50
Cleveland	16.50-17.00
Detroit	†13.00-13.50
Pittsburgh	16.50-17.00

FORGE SCRAP

Boston district	†7.00
Chicago, heavy	20.50-21.00

LOW PHOSPHORUS

Cleveland, crops	22.50-23.00
Eastern Pa., crops	24.00
Pitts., billet, bloom, slab crops	25.50-26.00

LOW PHOS. PUNCHINGS

Buffalo	20.00-20.50
Chicago	20.00-20.50
Cleveland	19.50-20.00
Eastern Pa.	23.00-24.00
Pittsburgh	23.50-24.00
Seattle	15.00
Detroit	†15.50-16.00

RAILS FOR ROLLING
5 feet and over

Birmingham	20.00
Boston	†16.00-16.50
Chicago	19.50-20.00
New York	†18.50-19.00
Eastern Pa.	23.00
St. Louis	19.50-20.00

STEEL CAR AXLES

Birmingham	19.00-20.00
Boston district	†16.00-16.50
Chicago, net	20.50-21.00
Eastern Pa.	24.00-24.50
St. Louis	20.75-21.25

LOCOMOTIVE TIRES

Chicago (cut)	20.00-20.50
St. Louis, No. 1	17.00-17.50

SHAFTING

Boston district	†18.50-18.75
New York	†18.00-18.50
Eastern Pa.	24.00
St. Louis, 1¼-3¾".	18.50-19.00

CAR WHEELS

Birmingham, iron	19.00-20.00
Boston dist., iron	†14.00-14.25
Buffalo, steel	21.50-22.00
Chicago, iron	17.00-17.50
Chicago, rolled steel	19.50-20.00
Cincin., iron, deal.	17.00-17.50
Eastern Pa., iron	20.00-20.50
Eastern Pa., steel	23.00-23.50
Pittsburgh, iron	21.00-21.50
Pittsburgh, steel	24.00-24.50
St. Louis, iron	19.00-19.50
St. Louis, steel	19.00-19.50

NO. 1 CAST SCRAP

Birmingham	13.00-13.50
Boston, No. 1 mach.	†15.25-15.75
N. Eng. del. No. 2	17.00-17.50
N. Eng. del. textile	18.25-18.75
Buffalo, cupola	17.50-18.00
Buffalo, mach.	18.00-18.50
Chicago, agri. net	14.00-14.50
Chicago, auto net	15.00-15.50
Chicago, railroad net	14.50-15.00
Chicago, mach. net	15.00-15.50
Cincin., mach. deal.	16.50-17.00
Cleveland, mach.	20.00-21.00
Detroit, cupola, net	†15.00-15.50
Eastern Pa., cupola	20.50-21.00
E. Pa., mixed yard	17.00-17.50
Los Angeles	15.50-16.00
Pittsburgh, cupola	19.50-20.00
San Francisco	15.50-16.00
Seattle	16.00-16.50
St. Louis, breakable	15.00-15.50
St. Louis agri. mach.	17.50-18.00
St. L., No. 1 mach.	18.00-18.50
San Francisco	16.00-17.00
Toronto, No. 1, mach., net, dealers	16.00

HEAVY CAST

Boston dist. break.	†13.50-13.75
New England, del.	15.50-16.00
Buffalo, break	15.00-15.50
Cleveland, break, net	15.25-15.75
Detroit, auto net	†16.00-16.50
Detroit, break	†13.00-13.50
Eastern Pa.	18.50-19.00
Los Ang., auto, net.	14.50
New York, break	†15.00-15.50
Pittsburgh, break	16.00-16.50

STOVE PLATE

Birmingham	9.00-10.00
Boston district	†12.50
Buffalo	13.50-14.00
Chicago, net	10.50-11.00
Cincinnati, dealers	9.00- 9.50
Detroit, net	†9.50-10.00
Eastern Pa.	16.00-16.50
New York, fdy.	13.00-13.50
St. Louis	11.00-11.50
Toronto dealers, net	11.00-11.50

MALLEABLE

Birmingham, R. R.	14.00-15.00
New England, del.	20.00-21.00
Buffalo	19.50-20.00
Chicago, R. R.	19.00-19.50
Cincin., agri., deal.	14.00-14.50
Cleveland, rail	22.50-23.00
Eastern Pa., R. R.	21.50-22.00
Los Angeles	12.50
Pittsburgh, rail	20.50-21.00
St. Louis, R. R.	17.50-18.00

Ores

Lake Superior Iron Ore

Gross ton, 51½ %
Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbessemer	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbessemer	5.10

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	9.00-10.00

Foreign Ore
(Prices nominal)

Cents per unit, c.i.f. Atlantic

Manganiferous ore, 45-55% Fe., 6-10% Mn.	14.00-15.00
North African low phos.	14.00
Spanish, No. African basic, 50 to 60%	14.00
Chinese wolframite, short ton unit, duty paid	$23.75-25.00
Scheelite, imp.	$25.00-26.00
Newfoundland fdry. 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$25.00-26.00

Manganese Ore

Including war risk but not duty, cents per unit cargo lots.

Caucasian, 50-52%	50.00-51.00
So. African, 50-52%	50.00-51.00
Indian, 49-50%	nom.
Brazilian, 48-52%	50.00
Cuban, 50-51%, duty free	61.20

Molybdenum

Sulphide conc., per lb., Mo. cont., mines	$0.75

Sheets, Strip

Sheet & Strip Prices, Pages 82, 83

Pittsburgh—Sheet and strip production is in excess of orders, although the difference is slight. Reaffirmation of most prices has had no appreciable effect on demand, but with major buyers well covered on first quarter needs, backlogs shortly are expected to start to decline. Recent price adjustments include a revision in manufacturers' standard practice in carbon steel sheets which revises the allowable gage limits for all of one gage and size. This separates the allowables into two sections, one for coated and one for uncoated sheets. Principal effect of this revision is to set up different classifications for uncoated sheets and make the allowable limits more flexible.

Cleveland—Buying has moderated but without effect on current shipments which are fully sustained. With deliveries in better relation to early needs of buyers and with fairly large orders already entered for first quarter movement, there is less occasion to contract far ahead.

Chicago—Specifications easily support the recent pace of shipments, although first quarter buying has moderated following fairly extensive coverage for that period. Farm equipment builders are marked for heavy requirements into next year.

Boston—Buying of narrow cold strip for first quarter shipment has declined slightly, as expected. Pressure for deliveries continues but some tonnage, estimated up to 20 per cent in some instances, originally scheduled for shipment by Dec. 31 will go over into 1940. At the current rate of consumption inventories will be low at the year-end.

Philadelphia — Some slow-up in sheets is reported. As an example, one consumer up to last week had been specifying 150 tons weekly, but this week will take 75 tons. Consumption continues at a high rate, however, and no large consumer stocks are being accumulated. One producer continues to ask more than the usual market for hot-rolled. Deliveries are shortening.

New York—Year-end inventories of cold strip will not be large, based on current rate of consumption. Orders for shipment next quarter have slackened slightly, but pressure for deliveries is maintained, with mills operating near capacity. First quarter backlogs are substantial.

Reduced sheet specifications are regarded as natural, although there still is considerable pressure for deliveries and a fairly good volume of orders. Stove plants appear as busy as ever, and operations of electric refrigerator manufacturers are steady though at the reduced rate in effect since earlier in the fall. Drum manufacturers are specifying actively. One reason for heavy output of drums is that the submarine menace is prompting oil exporters to ship their products in these containers with tramp steamers, rather than in expensive tankers.

Buffalo—While pressure for delivery is less pronounced, no tapering in production is noted and near-capacity schedules are expected to continue for several weeks. Decline in orders is attributed to previous heavy purchases for current and first quarter delivery.

Cincinnati—Orders have continued active since the first quarter price announcement, despite some decline from previous weeks this fall. Backlogs for next quarter are accumulating steadily, with deliveries now being promised well into February on many items.

St. Louis—Sheet and strip demand is unchanged by announcement of prices. Deliveries are freer and somewhat less pressure from users

The MARTIN No. 167 W
and
HEVI DUTY
FURNACES
In the building of the Martin 167 W Bomber and other Martin planes, the scientifically correct heat treatment of metal parts is of vital importance. The Glenn L. Martin Co. treat many of these important metal parts in Hevi Duty Electric Heat Treating Furnaces.
An HD-248418 Box Furnace—one of four similar Hevi Duty Furnaces at the Glenn L. Martin Co., Baltimore Md.

Send for Bulletin HD135

HEVI DUTY ELECTRIC COMPANY

HEAT TREATING FURNACES HEVI DUTY ELECTRIC EXCLUSIVELY

MILWAUKEE, WISCONSIN

is noted. Forward buying has tapered further, but is still substantial. Movement of galvanized sheets to the South and Southwest continues active.

Birmingham, Ala. — Sheet and strip buying while continuing active, is somewhat under previous weeks, with the result that orders are about matching production. No decline in output, especially of sheets, is noted.

Plates

Plate Prices, Page 82

Chicago—Plate needs of railroads and tank fabricators are outstanding and overshadow requirements for structural work. About 3500 tons of plates and shapes will be required for the car ferry placed by the Pere Marquette railroad with the Manitowoc Ship Building Corp., as reported in these columns several weeks ago.

New York—Demand is easier although still far from dull. Specifications against contracts are outstanding. Eastern plate producers who advanced their prices $5 a ton earlier in the fall continue to hold generally to this higher level on shipments through December, but their first quarter policy has yet to become clearly defined. Pan American Petroleum Corp. is taking bids on refinery equipment for installation in Texas, requiring several thousand tons of steel.

Philadelphia—Miscellaneous plate business continues fair but total volume is running behind shipments. Independents are booking nearby orders at 2.35c, base. Railroad specifications continue strong but new bookings have dropped off. According to trade reports, 4400 tons still is pending for two boats placed with Pusey & Jones. Bids on navy tonnage brought out uniform price of 2.10c, base, and the same figure is expected to apply on additional tonnage opening this week. Export is slow.

Birmingham, Ala.—Current plate bookings have eased considerably, due to completion of shipment for major car repair and shipbuilding programs. A satisfactory volume is materializing from tank manufacturers and miscellaneous sources. Some inroad is being made into backlogs.

Seattle—Inquiry for plates is slack, with no large projects up for immediate action. Shops report a recession in orders for tank and boiler jobs. Cle Elum, Wash., has approved a $238,000 WPA municipal water project involving 5½ miles of 16-inch steel pipe.

San Francisco — Little improvement in demand for plates is noted and most pending business is in lots of less than 100 tons. Awards totaled only 250 tons, bringing the aggregate to date to 90,676 tons, compared with 45,957 tons for the same period a year ago.

Plate Contracts Placed

3500 tons, Lake Michigan car ferry, Pere Marquette railway, to Manitowoc Ship Building Corp., Manitowoc, Wis.

Plate Contracts Pending

150 tons, liner plates for Conchas dam, New Mexico; bids opened.

Unstated. 5½ miles of 16-inch steel water pipe, for Cle Elum, Wash.; bids soon.

Unstated, caisson for Bonneville project; bids in to United States engineer.

Bars

Bar Prices, Page 82

Cleveland—Moderation in forward buying has been without effect on shipments. Deliveries in some cases are more extended than in any other products, consequently a tapering in first quarter contracting is not surprising. Backlogs in certain instances run into February, and capacity operations for at least the next six weeks appear assured.

Chicago—Sales for first quarter are slower than last month, but are proceeding at a consistent rate. Mills are almost entirely sold out on some sizes for first quarter, but in general there is still considerable room for more bookings. Price announcements made recently had little effect on demand, with bookings a bit slower immediately following, according to some interests. Warehouses, automotive interests and agricultural implement makers, are chief buyers.

Boston—Except for alloy bars, sales and specifications are off slightly, yet consumers are still pressing for delivery this quarter. Needs of miscellaneous consumers have been increasing slowly, and year-end inventories will be smaller than expected. For chain-making, the Boston navy yard is asking quotations on nickel-steel bar stock. Chromium-molybdenum material continues to move in good volume.

New York—Of all the major products, bars are most active here. Some letup is noted, but volume is still good and some leading sellers assert specifications are slightly faster than they are being handled. Specifications are from a wide variety of sources, although requirements of machine tool builders are outstanding. Car builders are also making substantial releases and considerable work, affecting special alloy bars in particular, is coming from government shops.

Philadelphia — Alloy steel bars continue in excellent demand, a considerable share of which is attributed to government sources. Hot carbon bars also are moving well. Builders of machine tools, car shops, and makers of screw machine products are busy. Makers of ball and roller bearings are operating night shifts.

Birmingham, Ala.—Bar production is at 90 per cent or better, but current orders have declined somewhat. Farm equipment manufacturers account for a large part of local production.

Buffalo—Bar mill operations are as close to capacity as raw steel supplies will permit. Sales are lighter, but backlogs will permit full operations through December and leave a fairly large tonnage for first quarter rolling.

Pipe

Pipe Prices, Page 83

Pittsburgh — Pipe demand from the construction industry has declined, as was expected, and seasonal factors also have caused a letdown in oil country specifications. Backlogs are heavy, however, and pipe mill schedules are well sustained. Good demand continues for pressure and mechanical tubing.

Orders for 25,000 tons of line pipe have been placed by Panhandle Eastern Pipe Line Co. with A. O. Smith Corp., Milwaukee, and National Tube Co., Pittsburgh. This includes 142 miles of 22 and 24-inch pipe. Contract for pipe couplings went to Dresser Mfg. Co., Bradford, Pa.

Cleveland—Steel pipe is not included in recent announcements of first quarter prices, but tubular quotations customarily are established until further notice, rather than on a quarterly basis. The last revision in discounts was in July, 1938. Business continues fairly active. Orders have moderated somewhat, but when coupled with present substantial backlogs, sales are sufficient to indicate heavy production well into next quarter.

French-made water pipe bought in July by the city of Detroit has been found not to conform to specifications, the city council has been told by the commissioner of purchases. The council voted to accept it if al-

lowance of $2657 is made on the total cost of $24,400.

San Francisco — Little new business in cast iron pipe is looked for during the remainder of year and recent bookings were limited to lots of less than 100 tons. Pending business includes 7052 tons of 12-inch pipe for the Panama Canal and 1660 tons for a 24 and 30-inch cast iron or welded steel or concrete pipe line for Burbank, Calif. To date this year 35,637 tons have been placed, compared with 29,892 tons for the corresponding period in 1938.

Rails, Cars

Track Material Prices, Page 83

Domestic freight car awards in November of 2650 units dropped sharply from the preceding two months. In September 23,000 cars were placed for the largest month of the year to date, and in October, 19,634 cars were let. The November figure brings the total for the first 11 months to 57,740, compared with 13,722 in the corresponding period of last year, 51,336 in the first 11 months of 1937 and 41,073 in the same period in 1936. Further comparisons follow:

	1939	1938	1937	1936
Jan.....	3	25	17,806	2,050
Feb.....	2,259	109	4,972	6,900
March....	800	680	8,155	632
April.....	3,095	15	9.772	4,427
May.....	2,051	6,014	4,732	8,900
June	1,324	1,178	548	5,200
July.....	110	0	1,030	7,229
Aug.	2,814	182	1,475	225
Sept.	23,000	1,750	1,216	1,750
Oct.....	19,634	2,537	1,355	2,210
Nov.	2,650	1,232	275	1,550
11 mos. ...	57,740	13,722	51,336	41,073
Dec.....	.....	2,581	275	23,450
Total...	.....	16,303	51,611	64,523

Featuring awards last month was the placing of 1100 cars by the Delaware, Lackawanna & Western. Several hundred cars for the New York, New Haven & Hartford and Lehigh Valley were among those carried over into this month for future action. However, it is doubted if the year's total will greatly exceed 60,000 cars. Awards so far in December have been negligible.

Chicago, Rock Island & Pacific has applied to interstate commerce commission for authority to issue $2,680,000 in equipment trust certificates to finance ten diesel-electric switching locomotitves and 1000 box cars, already tentatively awarded to builders.

Colorado & Southern and its subsidiary, Fort Worth & Denver City, have applied for RFC loans of $1,300,000 for purchase of two stainless steel diesel-electric Zephyr-type four-car trains. The locomotives probably will be placed with Electro-Motive Corp., La Grange, Ill., and the cars with Edward G. Budd Mfg. Co., Philadelphia.

Locomotives Placed

Central of Georgia, one 600-horsepower diesel-electric switch engine, to Electro-Motive Corp., La Grange, Ill.

Chicago, Rock Island & Pacific, 10 diesel-electric switch engines, 360-horsepower, five going to Davenport-Besler Corp., Davenport, Iowa and five to Whitcomb Locomotive Co., Philadelphia.

Nevada Consolidated Copper Co., seven electric locomotives, to General Electric Co., Schenectady, N. Y.

Panama Railroad, five diesel-electric locomotives, to General Electric Co., Schenectady, N. Y.

Tennessee Central, one 660-horsepower diesel-electric switch engine, to American Locomotive Co., New York.

Car Orders Placed

International Railways of Central America, five 7500-gallon tank cars, to Magor Car Corp., Clifton, N. J.

Pittsburgh & West Virginia, five caboose cars, to own shops.

Buses Booked

American Car & Foundry Motors Co.,

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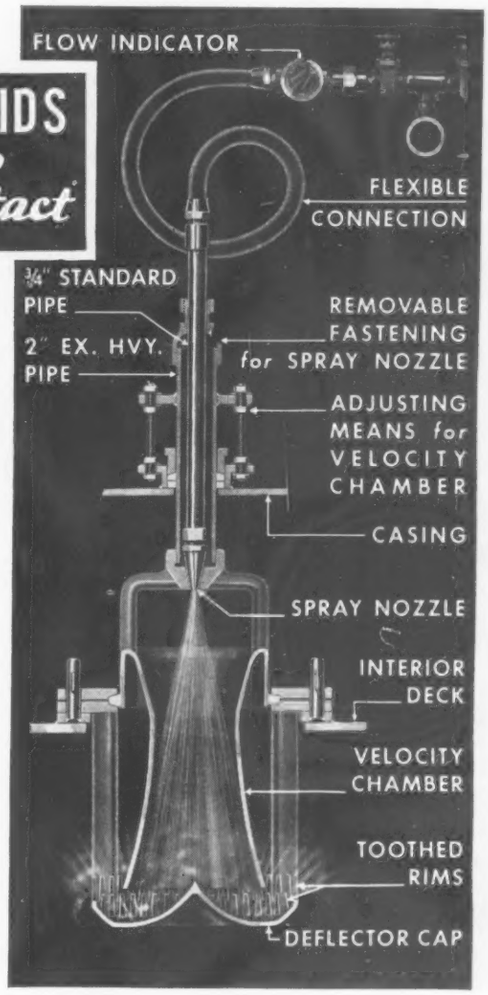

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Shapes

Structural Shape Prices, Page 82

Pittsburgh — Structural shape mills are able to meet delivery dates on contracts taken for the balance of this month. Steel is moving in better volume, and structural shops have experienced little difficulty in covering needs, although this has not been entirely true of small shapes.

Cleveland — Structural inquiries and awards consist mostly of small lots, although the number of miscellaneous industrial projects has declined since the bulge in such work in September and October. The Toledo, O., filtration plant, involving 480 tons of shapes and 5000 tons of concrete bars, is the principal pending item.

Chicago — Structural fabricators are depending to a large extent on private work, although some forms of public construction here have involved large lots. About 2200 tons is involved in a hangar and technical school for the army air corps at Rantoul, Ill.

New York—Inquiries include 800 tons for four bridges, New Jersey, closing Dec. 22 at Trenton. The bulk of pending New York state bridge contracts have been placed. Building construction, private and public, has slackened materially and the year-end will find a smaller tonnage active than a year ago. Plain material prices are steady.

Philadelphia — Navy department has postponed bids until Dec. 13 on steel for seven hangars, located from Porto Rico north to Massachusetts, involving about 7000 tons. Business is slow. Some South American business is reported, reflecting lack of German competition.

Buffalo — Pending business is mostly in small lots. Several large jobs are under construction, with little delay experienced in steel deliveries. Backlogs will help to provide fairly busy schedules for fabricators the next two months, but unfilled orders are declining.

Seattle—Largest tonnages in sight are for the navy airport projects at Sitka and Kodiak, Alaska. Important lettings for this work are expected soon. The week's awards exceeded 300 tons and included 254 tons for a Washington state bridge in Snohomish county, to Willamette Iron & Steel Works, Portland, and 65 tons for an undercrossing near Tacoma to Pacific Car & Foundry Co., Seattle.

San Francisco—One of the most important structural projects of the year has just come out for figures, 16,590 tons of shapes, 515 tons of steel castings and 153 tons of metal conduits for electrical purposes for the Pitt River bridge on the Central Valley project, Calif., up for bids Jan. 16. This will be the highest double-deck bridge in the world, a combination of cantilever and truss structure two-thirds of a mile long. Two of the Pitt River bridge piers will exceed 350 feet in height and will be among the highest in the world. Awards aggregated 336 tons, bringing the year's total to 150,631 tons, compared with 156,074 tons for the corresponding period in 1938. Pending business is heavy and exceeds 34,500 tons.

Shape Contracts Placed

1635 tons, naval medical center, bureau of yards and docks, Washington, to American Bridge Co., Pittsburgh, at $169,233; bids Nov. 22.

800 tons, addition to boiler house, Iowa Electric Light & Power Co., Cedar Rapids, Iowa, to Iowa Steel & Iron Works, Cedar Rapids, Iowa.

800 tons, shop building, Vulcan Detinning Co., Neville Island, Pittsburgh, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

650 tons, Krebs plant addition, E. I. du Pont de Nemours & Co., Edge Moor, Del., to American Bridge Co., Pittsburgh.

610 tons, repairs to bridges, various locations, for Chicago, Milwaukee, St. Paul & Pacific railroad, to Bethlehem Steel Co., Bethlehem, Pa.

489 tons, Nebraska state highway bridge, Lewellen, Nebr., to Colorado Bridge & Construction Co.

360 tons, state bridge RC-4084, Craigville, N. Y., to American Bridge Co., Pittsburgh.

300 tons, state bridge PSC-5975, Monroe, N. Y., to American Bridge Co., Pittsburgh.

255 tons, bridge FAP-270-C (2) Medina county, Texas, to Peden Steel Co., Raleigh, N. C.

254 tons, Washington state bridge, Snohomish county, to Willamette Iron & Steel Works, Portland, Oreg.; Rumsey & Co., Seattle, general contractor.

240 tons, Straus & Schramm building, Chicago, to Wendnagel & Co., Chicago.

215 tons, paper storage building, for Berst-Forster-Dixfield Co., Plattsburg, N. Y., to American Bridge Co., Pittsburgh.

200 tons, building, for New England Telephone & Telegraph Co., Springfield, Mass., to Haarmann Steel Co., Holyoke, Mass.

200 tons, foundations and floors, building 18, Brooklyn, N. Y., for United States navy, to North American Iron & Steel Co. Inc., Brooklyn, N. Y.

200 tons, building, Scranton Lace Co., Scranton, Pa., to Pine Iron Works Co., Pine Forge, Pa.

200 tons, store buildings, Shaker Square, Cleveland, to Kilroy Structural Steel Co., Cleveland.

180 tons, bridge FAP-1028-A (1) San Saba-Lampasas counties, Texas, to Peden Steel Co., Raleigh, N. C.

170 tons, beam span, Fremont county, Wyoming, to Des Moines Steel Co., Des Moines, Ia.

150 tons, state bridge RC-4085, West Danby, N. Y., to American Bridge Co., Pittsburgh.

150 tons, building, St. Bernard's convent, Fitchburg, Mass., to Haarmann Steel Co., Holyoke, Mass.

150 tons, state bridge No. 666, Jefferson, Wis., to Milwaukee Bridge Co., Milwaukee.

150 tons, highway bridge, Hardin county, Ohio, to Burger Iron Co., Akron, O.

150 tons, hangar, TACA airline, Costa Rica, to Belmont Iron Works, Philadelphia.

145 tons, dormitories, United States department of justice, Perkins, Fla., to Taylor Iron Works & Supply Co., Macon, Ga.

145 tons, rolled armor, Watts Bar, Tenn., Tennessee valley authority, spec. 226258, to Dravo Corp., Pittsburgh.

140 tons, highway bridge SP-20-1174-B, Copiah county, Mississippi, to Virginia Bridge Co., Roanoke, Va.

130 tons, open-hearth stripper runway, Pittsburgh Steel Co., Monessen, Pa., to Fort Pitt Bridge Works, Pittsburgh.

118 tons, underpass at Palo Alto, Calif., for state, to Bethlehem Steel Co., San Francisco.

115 tons, Shore Parkway contract MS-39-16, Brooklyn, to American Bridge Co., Pittsburgh.

110 tons, bridge FAP-1020-B (1) Hutchinson county, Texas, to Peden Steel Co., Raleigh, N. C.

105 tons, Church street bridge, Hornell, N. Y., to American Bridge Co., Pittsburgh.

105 tons, building addition, Diamond Alkali Co., Alkali, O., to Fort Pitt Bridge Works, Pittsburgh.

100 tons, building, Buttonwood Warehouse Co., Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

Shape Awards Compared

	Tons
Week ended Dec. 9	**9,721**
Week ended Dec. 2	**23,914**
Week ended Nov. 25	**24,255**
This week, 1938	**17,175**
Weekly average, year, 1938	**21,568**
Weekly average, 1939	**22,480**
Weekly average, November	**23,003**
Total to date, 1938	**1,017,484**
Total to date, 1939	**1,101,535**

Includes awards of 100 tons or more.

Shape Contracts Pending

16,590 tons, in addition to 515 tons of steel castings and 153 tons of metal conduits, Pitt river bridge near Redding, Calif., for Central valley project; bids Jan. 16.

7000 tons, seven hangars, navy department, Washington, bids postponed to Dec. 13.

2200 tons, jail and guard house, army air corps station, Chanute Field, Rantoul, Ill., bids Dec. 27, U. S. Quartermasters corps.

1600 tons, bridge at First and Figueroa

streets, Los Angeles; Bethlehem Steel Co., Los Angeles, submitted only bid.

900 tons, seaplane hangar, Pensacola, Fla., for United States navy.

700 tons, tunnel supports for Conchas dam, N. Mex.; bids opened.

550 tons, storage building and factory building addition, General Motors Corp., Linden, N. J.

500 tons, laboratory and shop buildings, Ft. Monmouth, N. J., for United States government.

480 tons, filtration plant, Toledo, O.; J. A. Utley, Detroit, low for general contract.

452 tons, viaduct, Devils Lake Fork, Wilson River, Tillamook county, Oreg., for state; bids opened.

450 tons, 10 beam bridges, Pennsylvania state highway department, Harrisburg, bids Dec. 15.

450 tons, industrial laboratory, Albany, Calif., for department of agriculture.

368 tons, bridge, Sussex county, New Jersey, bids Dec. 22, New Jersey state highway department, Trenton.

365 tons, 245-foot, four-span steel beam and concrete bridge, overpass, Delaware, Lackawanna & Western railroad and Culvers Brook, 69-foot width, Frankford township, Sussex county, New Jersey; bids Dec. 22.

325 tons, Cellars building, for John F. Trommer Inc., Orange, N. J.

300 tons, store building, Saginaw, Mich., for F. W. Woolworth Co.

300 tons, navy seaplane hangar and buildings, Tongue Point, Oreg.; H. J. Settergren, Portland, Oreg., low.

300 tons, lifting towers, etc., Kentucky dam, Gravel Switch, Ky.

300 tons, grandstand roof, for Queens County Jockey club, Aqueduct, N. Y.

275 tons, alterations to mill building, for Scranton Lace Co., Scranton, Pa.

200 tons, state highway overpass, Plaistow, N. H.

200 tons, dunnage for bomb storage magazine, Arsenal, Utah, for United States army.

195 tons, overpass, Pennsylvania-Reading Seashore Lines, Atlantic county, New Jersey; bids Dec. 22, Trenton.

190 tons, bridge, Atlantic county, New Jersey, bids Dec. 22, New Jersey state highway department, Trenton.

125 tons, radio towers, Alaska, for United States navy.

125 tons, grandstand extensions, Westchester Racing association, Belmont Park, N. Y.

125 tons two bridges, route 35, section 14-B, Sayreville-Woodbridge, N. J.; bids Dec. 22, Trenton.

112 tons, Cuthbert road bridge, Cooper river, Camden county, New Jersey; bids Dec. 22, Trenton.

110 tons, conveyor bridges, Colgate-Palmolive-Peet Co., Jersey City, N. J.

100 tons, Sixty-third street trestle repairs, Chicago Rapid Transit Lines, Chicago.

Unstated, sheet steel piling, $175,000 Puget Sound navy yard improvement; bids to yard, Dec. 13.

Wire

Wire Prices, Page 83

Cleveland—Wire and rod demand continues active, particularly for current shipment. Backlogs are extensive, already engaging a large part of first quarter capacity. As a consequence, new rod business finds application of revised prices announced a week ago to be applied on shipments after Dec. 31. These involve principally a change to quotations on a 100-pound basis, rather than per gross ton. Some consumers continue to press for delivery, although problems in this connection are less acute than was true 30 to 60 days ago.

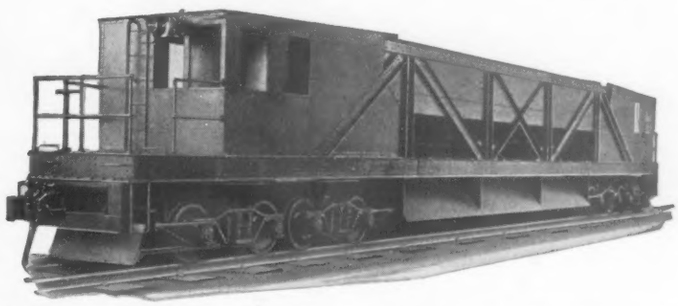
Birmingham, Ala.—Wire products are among the most consistent, demand including nails, fencing and practically all specifications. Production is above 90 per cent.

Reinforcing

Reinforcing Bar Prices, Page 83

New York — Buying is mostly in small lots, 50 tons and less. Inquiry is light, outstanding being 667 tons, mostly bars, involved in five New Jersey state highway and bridge contracts closing Dec. 22 at Trenton. Although not subject to much test,

ATLAS ORE TRANSFERS



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prices on small lots are generally firm.

Pittsburgh—Concrete bar prices are steady in most districts, with mills sold out for a number of weeks. Demand is off seasonally, and delivery problems are expected to be solved by the time the spring building season is under way.

Chicago—Large inquiries are scarce, but demand is considered satisfactory for this period. Small projects are fairly numerous, and a few major jobs are pending. Backlogs are declining, but mills are not yet caught up with orders.

Seattle—Recent placements have practically cleaned up pending business. Rolling mills have commitments to carry them into the new year. Seattle Steel Co. has taken 100 tons for state highway work in King county, Washington, and Bethlehem Steel Co., Seattle, has been awarded 159 tons by the reclamation bureau for the Leavenworth, Wash., fish hatchery. Puget sound navy yard has called bids Dec. 15 for concrete quay walls on concrete piling, tonnage unstated.

San Francisco—The reinforcing bar market was active and 1575 tons were booked, bringing the aggregate to date to 158,325 tons, compared with 145,911 tons for the same period last year. Bethlehem Steel Co. booked 350 tons for an addition to the Berkeley, Calif., high school. San Jose Steel Co. took 312 tons for an underpass at Palo Alto, Calif., for the state, Gilmore Fabricators Inc., 218 tons for a building in Oakland, Calif., for the Coca Cola Co., Kyle & Co. 212 tons for a junior college at Visalia, Calif., and Columbia Steel Co. 175 tons for a dock at Alcatraz Island, Calif.

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Reinforcing Steel Awards

1450 tons, Panama Canal schedule 3709, awarded as follows: 1125 tons to Republic Steel Corp., Cleveland; 300 tons to Sheffield Steel Corp., Kansas City, Mo.; and 25 tons to Bethlehem Steel Co., Bethlehem, Pa.

350 tons, addition, high school, Berkeley, Calif., to Bethlehem Steel Co., San Francisco.

312 tons, underpass at Palo Alto, Calif., for state, to San Jose Steel Co., San Jose, Calif.

218 tons, Coca-Cola building, Oakland, Calif., to Gilmore Fabricators Inc., San Francisco.

212 tons, junior college, Visalia, Calif., to Kyle & Co., Fresno, Calif.

200 tons, power plant, Public Service Co. of Indiana, Dresser, Ind., to Bethlehem Steel Co., Bethlehem, Pa.; Foundation Co., contractor.

200 tons, viaduct, L street, Omaha, Nebr., to Sheffield Steel Corp., Kansas City, Mo.; through Paxton-Vierling Steel Co., Omaha.

175 tons, dock at Alcatraz Island, Calif., to Columbia Steel Co., San Francisco.

159 tons, Leavenworth, Wash., fish hatchery, by reclamation bureau to Bethlehem Steel Co., Seattle.

100 tons, Washington state highway projects, King county, to Seattle Steel Co., Seattle.

Reinforcing Steel Pending

5000 tons, filtration plant, Toledo, O.; J. A. Utley, Detroit, low for general contract.

2600 tons, road work, section 18P2, Schedules 1, 2 and 3, Pennsylvania turnpike, Franklin county, bids Dec. 13.

1100 tons, Potrero Hills housing project, San Francisco; bids opened.

575 tons, road work, Pennsylvania turnpike, Westmoreland county, section

Concrete Bars Compared

	Tons
Week ended Dec. 9	3,376
Week ended Dec. 2	4,815
Week ended Nov. 25	1,847
This week, 1938	7,385
Weekly average, year, 1938	6,959
Weekly average, 1939	9,453
Weekly average, November	5,806
Total to date, 1938	333,399
Total to date, 1939	463,203

Includes awards of 100 tons or more.

2P2, bids Dec. 13.

500 tons, subway section S-9-C, Chicago.

375 tons, unit A, Parkside housing, Detroit.

375 tons, road work, section 8P2, Pennsylvania turnpike, Somerset county bids Dec. 13.

340 tons, road work, Pennsylvania turnpike, Bedford county, sections 12P2 and 13P1, bids Dec. 13.

230 tons, industrial laboratory unit and auditorium, United States department of agriculture, Albany, Calif.; bids opened.

200 tons, shopping center and stores, Philadelphia.

175 tons, storm sewer, Mt. Carmel, Ill.; Laclede Steel Co., St. Louis, low.

165 tons, mesh and bars, highway project, route 35, section 14-B, Sayreville-Woodbridge, N. J.; bids Dec. 22, Trenton.

165 tons, overpass, Delaware, Lackawanna & Western railroad, Frankford Township, N. J.; bids Dec. 22, Trenton.

125 tons, highway project, route 35, section 37, Monmouth county, New Jersey; bids Dec. 22, Trenton.

112 tons, Cuthbert road bridge, Cooper river, Camden county, New Jersey; bids Dec. 22, Trenton.

100 tons, overpass, Pennsylvania-Reading Seashore lines, Atlantic county, New Jersey; bids Dec. 22, Trenton.

100 tons, subway, Wabash railroad, Seventy-ninth street and Kedzie avenue, Chicago.

Pig Iron

Pig Iron Prices, Page 84

Pittsburgh—Beehive coke production is steady, about 85 per cent of the slightly more than 6500 available units being active. Prices are a trifle weaker, although most coke now being produced has been contracted for, and little new buying has appeared. By-product grades are scarce.

Cleveland — Shipments are sustained, and both deliveries and sales find little reflection from the price situation. First quarter orders are being accepted at current quotations, although there is no guarantee these figures will prevail through the period.

Chicago — Shipments are slightly ahead of November, but total tonnage this month is expected to be substantially unchanged. Coke shipments are the same as last month. Fair volume of iron has been sold for first quarter, although many buyers still have large orders on books. Jobbing and railroad foundries are operating lower, but automotive and agricultural implement plants are somewhat busier.

Boston—Reaffirming of pig iron prices eliminated any incentive for consumers to cover ahead. Shipments are substantial, although most foundries now have larger stocks than usual. Considering the high melt, however, supplies are not top-heavy and most consumers will be forced to purchase additional stocks should current schedules be maintained as expected. Five thousand tons has left for Europe, probably England, and exports from this port the last three months are estimated at close to 18,000 tons.

New York — While eastern pig iron sellers generally have opened books for first quarter at unchanged prices, consumers have not as yet begun to contract actively. Many still have tonnage on order which will last them well into next quarter, and while there is a possibility of a price increase after the turn of the year, they believe they will receive ample warning in the event of such a change. Shipments are still brisk but less active than a fortnight or so ago. This reflects not only the extension, but also the approaching holiday and inventory season.

Philadelphia—Several furnace interests, without formal announcements, indicate willingness to take business for next quarter at unchanged prices. No large buying is expected until well along in first quarter due to large carryover from fourth period. A Mid-Hudson river

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Gentlemen: Please send data on Model "C" Compressor, and your booklet, "How Air Is Being Used in Your Industry."

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Behind the Scenes with STEEL

Has Soviet Yet?

■ With all the grace and ease of a nice big giraffe sticking out its neck, one of our weekly contemporaries featured these sage remarks in its November 25 issue, just five days before a new rash of war broke out over Finland: Finns Safe From Soviet—*Knowing observers here are sure the Kremlin will not possibly risk a war at this time, despite the continuance of streamer headlines in Moscow berating the Finns. This realization, etc., etc.* That old saw about an expert being someone away from home seems to still have a touch of truth.

Long Lost Uncle

■ And from Washington comes an anonymous note and clipping that would put us in that select group of experts. In a very *economicy* article in the *Journal of Commerce* the linotypist inadvertently slipped in a by-line crediting ETAOIN SHRDLU with an expert analysis of the national debt and current budget. Of course, old friends of the SHRDLU family will remember Uncle ETAOIN. He has bounced around the country plenty since he was graduated from Mergenthalers State Teachers and it's nice to know he has finally settled down in a steady job.

In The Making

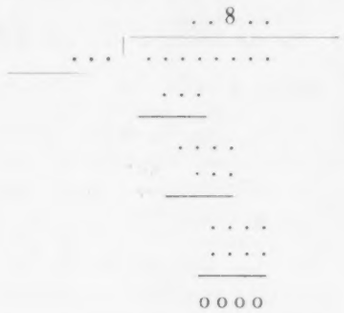
■ We've just come from a tour of the ninth floor here where STEEL's editors are slaving at top speed on what will be without doubt the finest Yearbook of Industry issue you've ever seen. Editorially it has been months in the making and it will be so jampacked with stuff right down your alley you'll probably take it to bed with you like Ann does her rag doll with the blonde hair. Artistically it is a thing of beauty and will deserve a prominent place on your desk for easy reference. We can't tell you more now but just sit tight and on the morning of January 2 we guarantee you'll be in for a very pleasant surprise in the form of an attractive green carton on your desk, labelled—STEEL, 1940 Yearbook issue.

A Steal At Four Bucks

■ And incidentally if you want a most appropriate gift for one of your friends or business associates, make it a year's subscription to STEEL. A peek at your calendar will reveal the amazing fact that there is an extra Monday next year you probably hadn't counted on and so you'll get 53 issues of this up-and-comin' paper. Send your orders right to us and we'll see to it that a nice card and the December 25 issue are sent special delivery to arrive bright and early Christmas morning.

On The Tough Side

■ Now that your Xmas problems are solved take a crack at this stickler, engineering editor Erle Ross just poked under our nose. The hieroglyphics below represent a simple long division problem and you're to fill in all the missing numbers which are indicated by periods.



In case you're interested that check last week was for $14.32.

Choice & Current

■ After taking a peek at that new Petty girl who is making her debut in a national advertising campaign, the office wit chirped: *Well, it's a great life, if you know when to weaken.* And how right he is.

SHRDLU

furnace is expected to remain out of blast indefinitely. Not much foreign business is reported, but movement against large British order placed several weeks ago continues.

Buffalo — Although silvery iron has been raised $1 a ton, current prices on other grades have been reaffirmed for next quarter. Base quotations are $23 for No. 2 foundry and $23.50 for malleable. Little influence on shipments or releases is looked for from this action. Foundry operations are steady, with no large additions to inventories.

Cincinnati—Northern iron producers have opened first quarter books, with prices reaffirmed at $23, base Hamilton, for No. 2 foundry. Only a small amount of buying has appeared. Shipments so far this month have been up to the November volume. Foundry operations are steady, a tapering in the stove and jobber melt being offset by gains elsewhere, principally on automotive parts.

St. Louis — November shipments were at the best daily rate since before the depression. Buying is quiet, consisting of occasional small lots for prompt shipment. The melt is at a two-month peak, with virtually all classes of consumers reporting satisfactory operations. Stove plant schedules are seasonally high.

Birmingham, Ala. — Pig iron production is at capacity. Except for possible repairs, there are no immediate indications of any stacks being taken off.

Toronto, Ont.—Sales are lighter, totaling less than 1000 tons for the week, but melters are piling iron against future needs when producers are faced with heavier steel production for war materials. Higher prices for first quarter now appear less likely, in view of reaffirmation of quotations in the United States. However, including all charges, Canadian prices are well below those at which United States producers could deliver iron in this country.

Scrap

Scrap Prices, Page 86

Pittsburgh—The market continues to reflect the strengthening which first appeared a week ago, although quotations are unchanged. Scattered buying of steel grades is in small lots, and blast furnace material is relatively dull. Scrap consumption continues heavy, but buyers indicate their position regarding supplies still is good.

Cleveland—Prices on recent railroad lists were lower and quotations have eased as a result, down

50 cents to $1 per ton. Shipments continue at a fair rate and several cargoes by lake are still on the way.

Chicago—Most recent mill purchases of scrap have brought $17 for No. 1 steel. This is 50 cents below the last sale and $3.50 less than the fall peak. A number of other grades also are 50 cents lower. The trade looks for little further price recession, although no substantial buying is expected before next quarter.

Boston — Buying has slackened with scattered price reductions, notably cast grades for New England delivery. Sale of No. 1 cast at $19 delivered is noted, but in general foundry buyers press for lower quotations. Cast prices, however, are partially sustained by export demand which is somewhat heavier. Close to 9500 tons is being loaded by two vessels in New England, but brokers are well covered. Brokers are seeking to purchase heavy melting steel for dock delivery at $16 and $15, respectively, for the two grades. Shipments to eastern Pennsylvania are light. Chemical borings, free of alloys, are weaker at $8.50 to $9 cars.

New York—Prices are weaker in sympathy with easier prices paid for eastern Pennsylvania delivery. Domestic buying is light, mills confining activity to shipments against orders. Foundries are taking little. Lack of boats is hampering export business, and prices of heavy melting steel for barge delivery are down $1.

Philadelphia — Further easiness has developed, with steelmaking grades off 50 cents and some specialties down as much as $1. Export market so far has failed to support prices, with several thousand tons sold a large independent mill which otherwise would have gone abroad had ship space been available. Part of this material is being diverted from the New York area.

E. G. Budd Mfg. Co. sold 5000 tons of new compressed sheets at approximately $18.50, f.o.b., but bids were entered prior to latest market weakness. No. 1 steel has sold as low as $18.50, delivered, and No. 2 at $17.50.

Buffalo—The market is in waiting period, with new business inconsequential. Influenced partly by lower quotations elsewhere, prices have been reduced further, bringing No. 1 steel down $1 to a range of $18 to $18.50. Quotations on a number of grades are nominal.

Cincinnati—Further weakness has appeared in scrap prices, with the market quiet. Shipments to district consumers are steady, but the movement to some nearby mills is slower. There are some expectations of renewed demand and a reversal in the price trend with the turn of the year.

Detroit—Prices are down another 50 cents on most grades, but scrap interests are about convinced the current decline has run its course. Indications are that large buyers may be back in the market soon. The bulk of present scrap output is being applied on old orders.

St. Louis—Prices still are declining, latest reductions ranging from 25 cents to $2 a ton on most grades. In some instances prices are close to pre-September levels. An east side mill has bought 6000 tons of No. 2 steel at $15, or 50 cents below the preceding purchase. Dealers still are bullish and are unwilling to take an extensive short position.

Seattle—From the high levels of September prices have receded almost to the pre-war figure. It is now strictly a buyers' market. Dealers have no prices out and local mills have withdrawn, although buying occasionally at from $10 to $14, depending on conditions. With Japan holding off and domestic demand low, volume of sales is markedly down.

Toronto, Ont. — The market is more active. Prices are firm except for a 50-cent reduction in machinery cast here and at Montreal. Country offerings are heavy, dealers finding it difficult to handle and store the increased receipts. The most active grade is low phosphorus steel, for which dealers are paying $12 a ton. Hamilton mills are taking all material offered, and electric furnace operators at Welland and Orillia also are buying heavily.

San Francisco—Demand for No. 1 heavy melting steel for export to Japan has fallen off and little new

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business is being placed. As a result there is a definite weakness and most domestic users display little interest in current prices at about $16.50 to $17.00 for No. 1 prepared scrap. Those in close touch with the situation expect lower prices before the first of the year. Reports from foundry operators indicate a slight falling off in demand for new castings. No. 1 cast scrap, at the moment, holds around $15.50 to 16.00 a ton.

Warehouse

Warehouse Prices, Page 85

Pittsburgh — Business remains brisk, with difficulties in obtaining sufficient supplies still a problem. Prices are firm, but premium offers are scarce.

Chicago—Demand continues fairly steady, the letdown being less than usually experienced at this time. Stocks are holding, receipts being balanced by shipments.

New York — Buying has slowed down slightly, but as a rule continues satisfactory. A price revision in hot sheets and possibly strip is thought likely around Jan. 1.

Philadelphia — Number of orders is holding up well but tonnage shows some shrinkage. Reaffirmation of mill quotations has resulted in weakness in certain warehouse items advanced several weeks ago, including galvanized sheets.

Buffalo—Sales still are considered favorable but are slightly under November. Extension of mill prices is inducing many consumers to restrict orders to prompt needs.

Cincinnati — Sales are sustained, chief support being from industrial demand. The peak in needs of coal mines has passed, and building items are slow.

St. Louis—Warehouses still are receiving a good volume of fill-in business from large steel users. Railroads are taking large lots of shop supplies. Miscellaneous demand is outstanding.

Seattle—The jobbing trade reports more stability in the local market following mill announcement of unchanged prices for first quarter.

Steel in Europe

Foreign Steel Prices, Page 85

London—(*By Cable*)—Industry in Great Britain is absorbing the full pig iron output and none is available for export. Allocations of steel and iron to commercial users by license is working satisfactorily. Semifinished steel supply is still short and users are hoping for larger importations from Belgium and France. Exports of tin plate and sheets are active.

Belgium and Luxemburg report export demand exceeds tonnage available. Prices are firm.

Tin Plate

Tin Plate Prices, Page 82

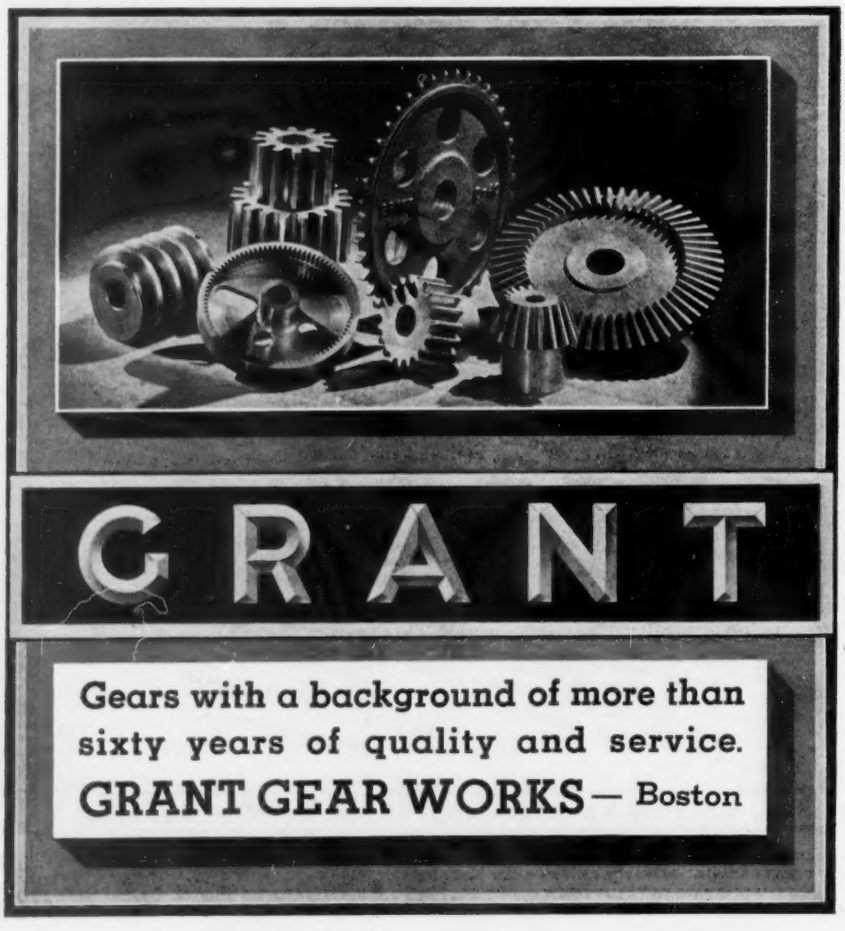
Despite some easing in pressure for delivery, a common trend at this period, both production and backlogs continue substantial. Operations are only slightly below 100 per cent. Active production is indicated into next quarter.

Asks Manganese Ore Bids

Procurement division, treasury department, is asking for bids Dec. 19 for manganese ore. Purchase is being made under the strategic minerals law.

Bids are being asked for 2000 to 45,000 long tons f.o.b. cars Curtis Bay, South Baltimore, Md.; 2000 to 45,000 tons c.i.f. Baltimore Harbor and 2000 to 15,000 tons f.o.b. army depot, Ogden, Utah.

A contract for 20,000 gross tons of chromium ore was awarded by the procurement division last week to Mutual Chemical Co., New York. Its bid was $26.50 per ton, c.i.f. Philadelphia. A contract for 25,000 tons of Alaskan chromium ore was placed by the division Nov. 21.



Ferroalloys

Ferroalloy Prices, Page 84

New York—Leading sellers generally have extended base prices into next quarter on all alloys except chrome alloys. Because of the sharp increase in cost of imported ore, the latter will be increased about 5 per cent. It has also been stated there will be some slight changes for special sizes, packages, quantities and delivery arrangements, which will affect certain alloys and which will be made to bring handling charges more in line with costs.

Ferromanganese is included in this price extension, continuing the market on contract and spot material at $100, duty paid, Atlantic and Gulf ports. However, a leading Philadelphia seller on Nov. 1 advanced its price on spot $10 to $110. The $100 price which has been generally adhered to became effective Oct. 1, at which time there was a $20 increase because of the rise in

manganese ore. Spiegeleisen, which usually follows the trend of ferromanganese, also has been reaffirmed for next quarter by the leading producer.

Fluorspar

Fluorspar Prices, Page 84

Fluorspar demand is less active. This is largely the result of the season and follows a heavy movement earlier in the fall. The quieter market has been accompanied by lower prices on imported material, a reduction of $1 cutting the range to $25 to $26 per net ton, duty paid, tidewater. Domestic quotations are steady, holding at $22, f.o.b. Illinois-Kentucky, for rail or barge delivery of washed gravel spar.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 83

Reaffirmation of current prices on bolts and nuts for first quarter delivery has been announced by a leading producer. This extension comes in the face of higher material costs, including the increase of $1.60 a ton on small-diameter wire rods. An additional size classification will be added on hot-presed and cold-punched nuts. The present 62 per cent discount on sizes 1⅛-inch and larger will apply on 1⅛ to 1½-inch inclusive, with 60 off quoted on sizes 1½-inch and larger.

Western Steelmaking Described in Pamphlet

■ *Steelmaking in the West*, a booklet depicting for the layman processes in the manufacture of steel products, has been issued by Columbia Steel Co., San Francico, subsidiary of United States Steel Corp. It describes and illustrates the company's production methods and facilities.

Ore mining at Iron Mountain, coal mine operations at Columbia and coke making at Ironton, Utah, are described. Included also are Columbia's blast furnace at Provo, Utah, with 550 tons daily capacity; four 50-ton basic open-hearth furnaces at Torrance, and six at Pittsburg, Calif. Four of the latter are 65-ton capacity, two 25-ton.

Wire-drawing of nails, wire rope and fence, castings and tin plate are also explained.

Equipment

Chicago—Good business for the next three months is expected by some machinery and equipment interests, on the basis of renewed interest in old inquiries. Many of these just recently have been brought back to life, with early closing indicated. Actual orders the past week fell off a little, but new inquiries are holding their own.

Boston—Machine builders are operating full schedules and in some instances overtime. Backlogs are heavy and continue to mount, with deliveries further extended on most lines. Some shops have orders for shipment in early 1941. Purchases by the metalworking industry and government shops continue brisk and well diversified. Although most machinery lines have advanced in price, units booked for delivery months ahead are being taken subject to further adjustment. Thus far internal and surface grinders have advanced only 5 per cent on an average.

Foreign orders are offered in substantial volume, but are subject to delay, with most shops scheduling domestic business first. Plants connected with the airplane industry are buying in good volume, also roller bearing producers, notably some of the small firms. Shipments against Russian orders are still going forward.

The Watertown, Mass., arsenal, Springfield, Mass., armory and Portsmouth, N. H., navy yard are still heavy purchasers, bids closing Dec. 14 on a group of ram-type universal turret lathes for the latter. Watertown has quotations on four heavy duty horizontal milling machines, 16 engine lathes, eight 54-inch center distance and eight 72-inch.

Seattle—Seasonal slackness is apparent. Dealers look for small volume this month, following rather heavy business in the last three months. Electrical equipment is probably in strongest demand. Ne-Page Electric Co., Seattle, has the contract to furnish $40,000 worth of control switchboards and bench board equipment for the Bonneville project, which has called bids at Portland Dec. 20 for a cooling tower at the Raymond, Wash., substation, Spec. 659.

Nonferrous Metals

New York—Extent of the decline in buying interest in nonferrous metal markets was indicated last week in the ½-cent reduction in prime western zinc which followed a period when consumers had diffi-

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DEVELOPED by United Chromium, through extensive research, "Unichrome" Rack Coating-W possesses the following outstanding advantages:

1. Withstands boiling cleaners and all plating solutions.
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4. Cuts costs—by greatly reducing the frequency of recoatings.
5. Easy to apply—by "dip and force-dry" method.
6. Light in color—easy to see how completely the rack is covered.
7. Any part of rack can be recoated without necessity of recoating entire rack.

Thoroughly proved in actual service—and now regularly used by many plating shops—this new rack coating material has produced amazingly fine results. Reports show that some racks coated with this material have gone through over 1,000 plating cycles without any insulation breakdown.

Write for Bulletin No. 20 containing complete information

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culty in obtaining desired tonnages and a monthly period during which stocks dropped to a new two-year low. The outside and resale electrolytic copper markets and domestic tin also displayed a softer tone while lead remained firm.

Copper—Electrolytic sold as low as 12.85c in both the export and resale markets but remained firm at 12.50c in the producers' market, reflecting in part the tight spot position. The daily average rate of sales dropped below 1000 tons for the first time since last August, although shipments to fabricators continued active in line with their capacity operations. The proposal to reduce the excise tax and the approach of the inventory period acted as checks on new buying.

Lead — Announcement following the outbreak of war in Europe that a leading producer would sell freely at the 5.35-cent level continues to stabilize the market at that level. Prices have remained firm and trading orderly up to the present time. The domestic market is supported further by the strongest statistical position since 1930 with refined stocks at the end of last month estimated at only 55,000 tons, equivalent to about one month's requirements.

Zinc—American Smelting & Refining Co. reduced its quotations on prime western zinc ½-cent on Dec. 4 to the basis of 6.00c, East St. Louis. All other leading sellers practically withdrew from the market by maintaining prices unchanged at 6.50c. A comparatively light volume of business was done at the lower level, indicating that consumers wished to await further developments. Stocks of slab zinc dropped 10,883 tons further during November to only 61,522 tons.

Tin—Tightness of spot supplies, due partly to difficulty in covering in the East, was matched by a lack of buying interest. This resulted in a steady decline in prices with Straits spot closing at 51.12½c compared with 52.50c at the end of the previous week.

Nonferrous Metal Prices

	Copper			Straits Tin, New York							
Dec.	Electro, del. Conn.	Lake, del. Midwest	Casting, refinery	Spot	Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
2	12.50	12.50	12.37½	52.50	50.25	5.50	5.35	6.50	20.00	14.00	35.00
4	12.50	12.50	12.37½	52.00	50.00	5.50	5.35	6.00	20.00	14.00	35.00
5	12.50	12.50	12.37½	52.00	50.00	5.50	5.35	6.00	20.00	14.00	35.00
6	12.50	12.50	12.37½	51.50	49.50	5.50	5.35	6.00	20.00	14.00	35.00
7	12.50	12.50	12.37½	51.25	49.25	5.50	5.35	6.00	20.00	14.00	35.00
8	12.50	12.50	12.37½	51.12½	49.00	5.50	5.35	6.00	20.00	14.00	35.00

*Nominal.

MILL PRODUCTS

F.o.b. mill base, cents per lb., except as specified. Copper brass products based on 12.50c Conn. copper

Sheets

Yellow brass (high)	19.31
Copper, hot rolled	21.12
Lead, cut to jobbers	8.75
Zinc, 100 lb. base	11.25

Tubes

High yellow brass	22.06
Seamless copper	21.62

Rods

High yellow brass	15.23
Copper, hot rolled	17.62

Anodes

Copper, untrimmed	18.37

Wire

Yellow brass (high)	19.56

OLD METALS

Nom. Dealers' Buying Prices

No. 1 Composition Red Brass

New York	8.37½-8.56
Cleveland	9.25-9.50
Chicago	8.75-9.00
St. Louis	8.25-8.50

Heavy Copper and Wire

New York, No. 1	10.00-10.25
Cleveland, No. 1	10.25-10.50
Chicago, No. 1	10.00-10.25
St. Louis	9.25-9.50

Composition Brass Turnings

New York	8.00-8.25

Light Copper

New York	8.00-8.25
Cleveland	8.25-8.50
Chicago	7.87½-8.12½
St. Louis	7.25-7.50

Light Brass

Cleveland	5.00-5.25
Chicago	5.62½-5.87½
St. Louis	5.00-5.50

Lead

New York	4.85
Cleveland	4.37½-4.50
Chicago	4.25-4.50
St. Louis	4.00-4.25

Zinc

New York	3.50-3.75
Cleveland	3.25-3.50
St. Louis	3.25-3.50

Aluminum

Mixed, cast, Cleveland	10.25-10.50
Borings, Cleveland	7.25-7.50
Clips, soft, Cleveland	16.00-16.50
Misc. cast, St. Louis	8.75-9.00

SECONDARY METALS

Brass ingot, 85-5-5-5, less carloads	13.75
Standard No. 12 aluminum	15.00-15.25

Construction and Enterprise

Ohio

ALLIANCE, O.—Ohio Public Service Co., C. C. Henderson, vice president and division manager, 526 East Main, plans rehabilitation of Lake Park plant, including rebuilding of turbine, installation of new coal and ash-handling equipment in boiler plant, line improvements and extensions. Total cost of project to be about $150,000. Work to start soon.

AMHERST, O.—Village, Conrad Zilch, president, board of public affairs, contemplates construction of power and light plant including two 500-kilowatt steam engine-driven generators, two 300-horsepower nominal rating multi-drum bent-tube type boilers equipped with single retort underfeed stokers and all necessary appurtenances, two duplex boiler feed pumps, each having capacity of 20,000 pounds per hour, feed water heater, coal and ash-handling equipment, switchboard and wiring, high and low pressure piping and valves, other required miscellaneous equipment. Estimated total cost, $145,000. Will advertise for bids about Dec. 15. (Noted Nov. 6.)

CINCINNATI—City, H. H. Kranz, engineer, plans improvements to waterworks pumping plant, including installation of four electric centrifugal pumps. Total cost estimated at $1,728,000. (Noted Nov. 13).

DAYTON, O.—City, H. A. Maltby, purchasing agent, is taking bids to Dec. 22, 10 a.m., on one electrically operated hydraulic lift and one vapor pressure cleaning machine.

DAYTON, O.—Contracting officer, materiel division, Wright field, takes bids until 10 a.m., Dec. 19 on one 7-inch horizontal shaper, one pedestal type die-making machine; 10 a.m., Dec. 21 on 284 portable electric power plants, 40 power plant assemblies.

MT. GILEAD, O.—Hydraulic Press Mfg. Co. stockholders voted $500,000 to be used for new factory and installation of new equipment.

REPUBLIC, O.—Village, C. E. Womer, mayor, contemplates construction of complete waterworks system to cost approximately $78,000. Petition for WPA grant has been filed, awaits presidential approval.

Connecticut

GLENBROOK, CONN. — Laminated Shim Co. Inc., 21-24 Forty-fourth avenue, Long Island City, N. Y., plans 1-story 100 x 250-foot factory and a 2-story 30 x 70-foot office building. L. F. Caproni, 221 Chapel street, New Haven, Conn., engineer.

Massachusetts

BOSTON, MASS.—Commonwealth of Massachusetts, metropolitan district commission, sewer division, J. P. Dever, chief engineer, 20 Somerset street, has preliminary studies in progress for pumping and disposal station with equipment and appurtenances to cost $4,160,000; also for pumping and disposal station with equipment and appurtenances to cost $3,050,000. Projects approved by legislature. Greeley & Hansen, 6 North Michigan street, Chicago, and Metcalf & Eddy, 1300 Statler building, Boston, consulting engineers.

New York

AMSTERDAM, N. Y.—New York Power & Light Corp. contemplates construction of a 3000 kilowatt power station to cost $50,000. Owner's engineer, C. W. Martin, in charge.

BATAVIA, N. Y.—Doehler Die Casting Co., T. H. Pickering, plant superintendent, is taking bids on a new foundry, to cost approximately $40,000.

NEW YORK—National Gypsum Co., 190 Delaware avenue, Buffalo, plans $2,000,000 plant extension. Private plans.

New Jersey

ELIZABETH, N. J.—Peter J. Schweitzer Inc., 944 Newark avenue, plans construction of a 1-story factory at cost of $1,000,000. Architect not yet appointed.

NEW PROVIDENCE, N. J.—Bell Telephone Laboratories Inc., 463 West street, New York, plans installation of motors and controls, regulators, switchgear and considerable standard and special electrical apparatus in new laboratory at Murray Hill, near here.

SOMERDALE, N. J. — City contemplates construction of sewage disposal plant and pumping station; will receive WPA help. Total cost of project, $305,343. P. Costello, Third and Arch streets, Camden, N. J., is owner's and WPA engineer.

Pennsylvania

BETHLEHEM, PA. — Superior Metal Co. plans erection of a 1-story addition to its products plant. Will use private plans; cost, $40,000.

EBENSBURG, PA.—Cambria Electric Co-operative Inc., E. Jones, president, has $134,000 REA loan for about 114 miles rural transmission line in Cambria county.

PHILADELPHIA — Pennsylvania Salt Mfg. Co., Widener building, plans installation of motors and controls, power substation apparatus, regulators, conveyors, other equipment in new chemical manufacturing plant. Total cost of new plant in excess of $2,500,000.

WILLIAMSPORT, PA.—Lycoming division of Aviation Mfg. Corp., manufacturer of airplane engines and parts, plans installation of motors and controls, conveyors, electric hoists, other equipment in connection with modernization and expansion of plant. Work to be started soon; entire project will cost approximately $400,000.

Michigan

BATTLE CREEK, MICH.—Wilcox-Rich division of Eaton Mfg. Co., Cleveland, will erect addition to its factory here. George S. Rider Co., Cleveland, architect.

HOLLAND, MICH.—Holland Precision Parts Co. plans $60,000 factory for manufacture of automobile and airplane parts. Private plans.

JACKSON, MICH.—Electrical Mfg. Co. has been incorporated by George C. Price, Parkersburg, W. Va., to manufacture electrical specialties.

Illinois

MOLINE, ILL.—Previous report, STEEL, Nov. 27, p. 97, that Frank Foundries Corp., George D. Frank, treasurer-general manager, plans rebuilding factory unit destroyed by fire has proved incorrect. Fire damage was slight; no rebuilding or expansion is planned.

Alabama

CLAYTON, ALA.—Pea River Electric Membership Corp. has been allotted $111,000 REA loan for rural transmission lines.

District of Columbia

WASHINGTON—Bureau of yards and docks, navy department, receives bids, no closing date stated, for a complete coal

What happened after Archimedes sat up in his bath and shouted "Eureka"? No one seems to care; presumably he got out of the tub. There is no question, however, about what happens to

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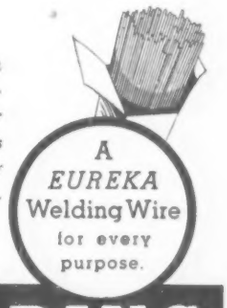

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ADVERTISING PAGES REMOVED

and air-handling system, with motors and controls, accessory apparatus for installation in power plant at navy yard, Pearl Harbor, Hawaii.

WASHINGTON—Navy department bureau of supplies and accounts will take bids until 10 a.m., Dec. 15 on one motor-driven bench precision lathe, one motor-driven shallow gap power squaring machine, one high speed vertical dial type heavy duty milling machine, one motor-driven hydraulic test pump and one motor-driven vertical metal shaper; 10 a.m., Dec. 19, two motor-driven precision toolroom lathes.

Maryland

CUMBERLAND, MD.—Celanese Corp. of America Inc. plans installation of motors and controls, conveyors, regulators and other equipment in new addition to cellulose rayon mill at Amcelle, Md. Cost, more than $150,000.

Florida

CORAL GABLES, FLA. — City, A. B. Curry, manager and engineer, receives bids Dec. 19 on one 50-ton incinerator, accessory equipment.

Georgia

SAVANNAH, GA.—Union Bag & Paper Corp. is reported planning erection of evaporation house, 3-story structure, to cost about $90,000 including machinery.

WINDER, GA. — National Furniture Co.'s manufacturing plant was damaged by fire; loss $85,000.

YOUNG HARRIS, GA. — Blue Ridge electric association has $45,000 REA loan for rural transmission lines.

Mississippi

COLUMBUS, MISS.—Four county electric power association has been allotted $404,500 REA loan for rural transmission lines.

NATCHEZ, MISS.—City has voted $33,000 bonds to match a $27,000 PWA grant to purchase engines, generators and other equipment for water supply system. Project to cost $300,000.

PONTOTOC, MISS.—Pontotoc electric power association has $238,000 REA loan for rural electrification program.

Tennessee

KNOXVILLE, TENN.—Knoxville electric power and water board has secured $175,000 REA loan for 200 miles rural transmission lines in Knox, Jefferson, Union, Sevier and Grainger counties.

MARTIN, TENN. — Weakley county municipal electric system has secured $55,000 for electrification program.

PARIS, TENN.—Board of public utilities has $140,000 REA allotment for rural transmission lines.

West Virginia

WINDSOR, W. VA.—West Penn Power Co., subsidiary of American Water Works & Electric Co., New York, plans construction of 60,000 kilowatt steam generating addition to station here. Station capacity will be increased to 240,000 kilowatts.

Missouri

HIGGINSVILLE, MO.—West Central Electric Co-operative Inc., P. Greer, correspondent, is seeking $175,000 REA grant for approximately 175 miles rural transmission lines in Johnson and Lafayette counties. Burns & McDonnell Engineering Co., 107 West Linwood boulevard, Kansas City, Mo., engineers.

ST. LOUIS — Barrett Equipment Co., 2101 Cass avenue, has acquired building, will remodel for office, laboratory and plant for manufacture of fender rolling, brake lining, and similar material.

Oklahoma

STILLWATER, OKLA.—City, board of commissioners, plans expansion and improvements in municipal power station and waterworks plant, with installation of a new 4000 kilowatt turbine-generator unit, boiler and auxiliary equipment. Cost estimated at more than $285,000. Extension and modernization of electrical distributing system, including power substation units at cost of $335,000 also planned.

Wisconsin

MADISON, WIS.—Fauerbach Brewing Co. plans construction of bottling plant to cost about $175,000. Balch & Lippert, architects.

Minnesota

RUSHFORD, MINN.—City, C. Reishus, clerk, is preparing preliminary plans for construction of a complete municipal power and light plant to cost about $80,000. Ealy G. Briggs, 1957 University avenue, St. Paul, is consulting engineer.

Texas

COLEMAN, TEX.—City, E. P. Scarborough, mayor, receives bids Dec. 15 on one 500 horsepower water tube boiler with superheater and stack, one 750 kilowatt steam turbine and generator, one surface condenser with auxiliaries, two centrifugal boiler feed pumps with motors. Terrell Bartlett Engineers, 2607 Smith-Young Tower, San Antonio, Tex., engineers. (Noted Nov. 13.)

PALESTINE, TEX.—W. T. LaRue is interested in construction of 100 miles rural transmission lines in Houston and Anderson counties at cost of about $200,000.

PHARR, TEX. — San-Pat Vegetable Co., Pharr, and Missouri Pacific Railway Co., F. E. Bates, chief engineer, Missouri Pacific building, St. Louis, plan construction of fruit and vegetable loading and packing plant here. To cost $40,000.

SOUR LAKE, TEX.—City, F. H. Carpenter Jr., mayor, plans waterworks and sewage disposal plant.

Nebraska

LEXINGTON, NEBR.—City, Joseph J. Olsson, clerk, has filed application with WPA for funds and assistance in construction of sewage disposal plant. E. H. Dunmire, 1802 B street, Lincoln, Nebr., is consulting engineer.

Iowa

ATLANTIC, IOWA—City is preparing plans for construction of sewage disposal plant to cost approximately $100,000, will have them ready for approval by council in April. Buell & Winter Engineering Co., 508 Insurance Exchange building, Sioux City, Iowa, are consulting engineers.

COUNCIL BLUFFS, IOWA—Chicago & North Western Railway Co. has awarded contract for construction of machine shop addition, 100 x 150 feet, to Andersen Construction Co.

DAVENPORT, IOWA—Ever Tite Mfg. Co. has been incorporated by Gustav C. Monckmeier and Frank G. Bickel to manufacture automobile accessories and equipment; capitalization, $60,000.

Colorado

ESTES PARK, COLO.—Stanley hotel is preparing final plans for construction of a sewage disposal plant, will take bids soon. Burton Lowther, 725 Colorado building, Denver, is consulting engineer.

WALSENBURG, COLO.—City, Dr. S. Julian Lamme, mayor, has forwarded to WPA for approval final plans for water filtration plant to cost $50,000. Funds have been allotted. Burton Lowther, 725 Colorado building, Denver, is consulting engineer.

Montana

LIBBY, MONT.—Glacier Silver-Lead Mining Co., F. W. Kiesling, secretary, has started work on a power plant near here; will install two diesel engines and two generators.

Idaho

HEADQUARTERS, IDAHO — Tractor shop and machinery of Potlatch Forests Inc. were recently destroyed by fire. Estimates of damage not available. Replacements will be required.

RICHFIELD, IDAHO—Newt Crawford, correspondent for rural electrification co-operative being formed, has $87,000 REA allotment for 80 miles rural transmission line in Lincoln county. (Noted Nov. 20).

Arizona

FT. HUACHUCA, ARIZ.—Quartermaster, Ft. Huachuca, plans immediate call for bids on new convertible gas-diesel engine-generating unit and auxiliary equipment to be installed in local power plant.

Pacific Coast

COMPTON, CALIF.—J. F. Cassel and William J. Blackburn have been granted certificate to conduct business under firm name of Compton Metals Co., 2320 North Alameda street.

GLENDALE, CALIF.—City has started construction of new $1,800,000 municipal electric generating plant, to be built by the public service department, Peter Diederich, superintendent.

PASCO, WASH.—F. D. Owens is preparing site for erection of skeleton plant for manufacture of barge and tank materials. Shop equipped with modern machinery to be installed later.

SUNNYSIDE, WASH.—Bonneville authority plans construction of power substation here, a unit in the Bonneville-Coulee transmission line.

Canada

LLOYDMINSTER, B. C.—Shaw Petroleum Co. Ltd., R. L. Shaw, manager, plans erection of $50,000 oil refinery.

FRANKFORD, ONT.—City contemplates construction of sewage disposal system costing $60,000. Ontario department of health, Toronto, engineers.

LEASIDE, ONT.—James R. Kearney Corp. of Canada Ltd., 660 King street, West, Toronto, Ont., stove manufacturer, will erect $60,000 factory here.

PORT ARTHUR, ONT.—Steep Rock Iron Mines, Joseph Errington, 14 King street, West, Toronto, Ont., president, is developing iron property in Atikokan section, has taken option on harbor site here; plans to construct docks, loading and handling equipment when mine goes into production during coming year.

MONTREAL, QUE. — Delorimier Construction Co., 4519 Christophe Colomb street, has been awarded general contract for construction of $20,000 machine shop for A. E. Whitehouse, 976 St. George street.

READER Comments

Readers are invited to comment upon articles, editorials, reports, prices or other editorial material appearing in STEEL. The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief—preferably not exceeding 250 words.

STEEL Glad to Help

To the Editor:

In your Dec. 4 issue, p. 27, there appeared an illustration showing a destroyed bridge, captioned, "Modern Traffic vs. 'Horse-and-Buggy' Bridges."

In Connellsville we have a dangerous bridge situation that should be remedied and we are trying every means to have the present span replaced. We believe that the illustration would help drive home to the responsible persons the need for immediate drastic action.

We would be pleased to obtain the cut for use in *The Courier,* for years recognized as an authority on beehive coke.

JAMES M. DRISCOLL

The Courier,
Connellsville, Pa.

Editors' Note—STEEL is glad to aid in removing a source of danger and has sent the cut to *The Courier.*

Scrap Statistics Valuable

To the Editor:

It is gratifying to those in the scrap industry to note the increasing interest shown in obtaining statistics of production, stocks and consumption of this raw material.

Until recently practically nothing was known about this important source of raw materials for the steel industry, from a statistical point of view, though the fact was repeatedly stated that it conserved iron ore at the rate of about two tons for each ton of scrap melted.

One of the first efforts along this line was by the American Iron and Steel institute, which gathered from steelmakers figures on the tonnage of their home scrap recycled in their own plants and the tonnage purchased in the market. Then the Institute of Scrap Iron and Steel Inc. collected figures from its members on which to base an estimate of consumption.

Now the bureau of mines has made a survey of stocks in hands of consumers and suppliers (STEEL, Dec. 11, p. 33) and plans to make another survey at the end of the year.

From all these efforts at obtaining reliable figures, comparable with iron ore production and consumption, pig iron and steel ingot production, will emerge an official airplane view of the industry which will be of the greatest value to producers, suppliers and consumers.

Perhaps means will be found, as a result of better knowledge of the conditions, to stabilize the business of scrap selling and buying, which will level the curve of prices. This consummation has been desired for a long time by all concerned but the means for applying it has been lacking.

With such an organization of dealers as the Scrap institute, working with the Steel institute and the government, armed with definite figures, some approach to this result may be obtained. Those of us who have been long in the business have been gratified at the growing interest along this line and await further developments with expectation of much good resulting.

BROKER

Pittsburgh

Put Business in Politics

To the Editor:

In a recent issue of STEEL you quote former senator George W. Pepper of Pennsylvania to the effect business is largely responsible for the odium various agencies have attached to it. That it is responsible, in part at least, for the systematic governmental "regulations" which are strangling enterprise. That it has only itself to blame if constitutional democracy dies here as it has died in other nations. That it has done little to remedy matters.

Business is at fault.

American businessmen have long regarded government and its administration as necessary to the welfare of the nation, but as something quite foreign to their particular interests. So long as they were permitted to pursue their course unhampered by restrictions government and its problems were considered of minor importance.

Public officials were usually selected from any vocation other than business. Lawyers, teachers, farmers, tailors, blacksmiths, all have been leaders in government. But businessmen, best suited by training and experience to properly administer a collective enterprise far greater than that any one of them possessed, refused to do their part.

The only solution is for businessmen everywhere to get into the political picture, attend the polls, and assume their share of the responsibilities of government.

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machines 50% to 100% faster

than any other open hearth case carburizing steel

- Ductility equal to X1020
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- 4 to 10 times better "tool-life"
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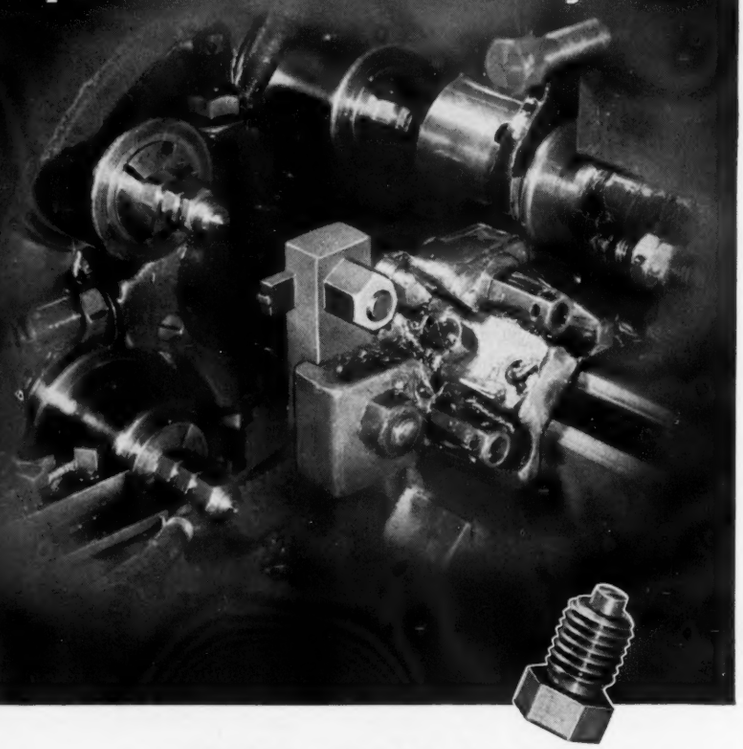
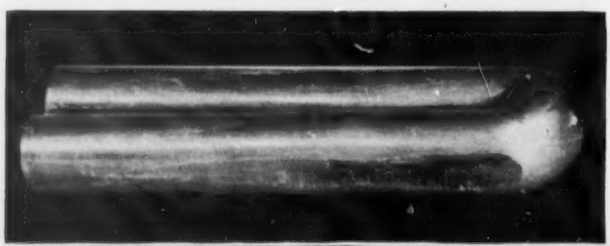


SPEED CASE X-1515

Speed Case is the FASTEST machining open hearth, case hardening steel made! Its machining rate is over 220 surface feet per minute. It is cold drawn and contains a maximum of .20 carbon and .20-.30 sulphur—permitting maximum machinability without any loss in strength or ductility. Its tensile strength is approximately 85,000 P. S. I. *Increase* your production from 30% to 50% with SPEED CASE.

Despite approximately .24 per cent sulphur content, this 1 inch round, cold drawn, free machining .15-.20 carbon Speed Case steel bar was bent cold in a 150 ton press WITHOUT SIGN OF FRACTURE. (Photo is unretouched.)



SPEED TREAT X-1545

Speed Treat X-1545 is produced under the same exclusive process as Speed Case and, like its twin, is in a free cutting class of its own. It machines at approximately 140 surface feet per minute . . . has a .40-.50 carbon range . . . a tensile strength of approximately 110,000 P. S. I. Write us for full information on these steels and also on cold drawn, turned and polished and turned and ground steels in all carbon and alloy analyses.

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